THE GREAT WAR IN THE AIR

The Great War in the Air: By Edgar Middleton (late R.N.A.S. and R.A.F.)

VOLUME II

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THE GREAT WAR IN THE AIR

VOLUME II

CHAPTER I

PSYCHOLOGY OF MASTERY OF THE AIR

Mastery of the Air—The Aerial Ascendancy of the Allies—German Propaganda—Violation of Neutrality—Actions and Reactions—An Epic of Aerial Warfare.

SEVENTEEN months of war—seventeen short months in which to judge of the development and military value of the most stupendous innovation of modern warfare. The time is too brief. However, while it is yet too early to attain any definite conclusions, it is equally late to remark on the ample evidence which already presages the wonderful future of aircraft in the Great War. At the end of 1915 the battle position in the air is still in its most nebulous form. In every theatre of operation the advent of aircraft has been hailed with considerable wonder and no less enthusiasm; every battle-line suddenly has been extended from the earth, through the air, ten, twenty, fifty miles beyond the opposing lines of trenches. The war by air has been carried into the heart of the belligerent countries. Though seemingly the objective of the myriads of battling aircraft is still in its vaguest form, the undoubted intention of the Allies and the enemy, alike, is to attain the mastery of the air. And how exactly in what terms is that mastery defined?

Three years later, with a not inconsiderable experience of the most murderous and destructive months of battle aviation, Major-General Sir Hugh Trenchard, the greatest aerial commander of history, remarked that such a condition as the "Mastery of the Air" did not, and could never, exist. The air

front was too infinite. The British mastery of the seas in the war, as is now generally realised, was an almost superhuman achievement. There are boundaries to the sea, while to the air there are none. The limits of aviation embrace the seven seas, the seven continents, and the heavens, alike. No object, however, would be served in attaining any form of ascendancy in any such vast space so remote and irrelative to the main battle-front. The student of aerial warfare must remember that the mastery of the air inclines not so much to the prevailing situation in the air as to the value of that situation relative to the corresponding surface operations.

The British Policy of Attack

At no period of the war did the British, or for that matter, the Allies, at one time achieve the mastery of the air from the Vosges to the North Sea; at no period of the war did they attempt any such impossible objective. What they did attempt, what they did achieve, however, was a temporary ascendancy in certain localities immediately prior to an extensive ground attack in the same area. And here some more concrete idea may be obtained of the conditions which supplied that temporary ascendancy.

The aeroplane in war, as has elsewhere and frequently been stated, was the eye of the armies in the field. It was more. The bombing machine was the long-range gun of the artillery; later, the fighting scout became the cavalry patrol in advance, clearing the way for the infantry bayonet attack. However, before either eye, or gun, or patrol could operate effectively, defence was essential from hostile aircraft. The first step necessary to the mastery of the air was to clear the skies of enemy machines. This was the first business of the battle-planes. The reconnaissance craft, once this clearance had been achieved, immediately got to work, spying out the dispositions of the enemy troops and their gun emplacements; gaining, at the same time, valuable information for the Staff and the exact locality of possible targets for the long-range artillery and the bombing machines. Again, aerial observers directed the fire of the former, and fighting scouts escorted the latter; later photographers in the air gained an accurate idea of the damage

hieved, until, the area of attack having been made conicuous as an open book, and every vital point of the enemy's es of communication devastated, the fighting scouts again ayed an invaluable part—as "contact patrols"—in coeration with the advancing infantry. At least this was the itish policy of aerial attack.

After seventeen months of war the situation on the Western d the Rhine fronts was without parallel in all military history. ne development of British aircraft in war had surpassed even e dreams of the most sanguine believer of the future of iation. No one of them could have dared to prophesy what d actually come to pass. Already it was clear, even to the ost unintelligent observer, that a modern army in the field uld not avert a final and disastrous defeat for over three onths unless equipped with a powerful air force. Contrariise, it would appear impossible that between the Great Powers Europe any one Power or group of Powers could establish ch an ascendancy as to control the air, for all practical rposes, on any particular sector of the front, as if no enemy rcraft were to be feared in opposition. Yet this is actually hat the British R.F.C. had established on several occasions, nd the consequent gain to the Allies was extraordinary, from oth strategic and tactical points of view. Later we shall learn ow these limited controls were effected.

he Desire of the Germans

The Germans, in their advance from the Marne, the moment ey found themselves likely to be confronted by an equal mber of bayonets and of guns, decided to outbuild and tclass the Allies in the air. During the delay, necessary to ch an extensive programme, came the golden opportunity of e Allied airmen. Month by month, day by day, the influence aerial operations was altering completely the nature of the oblem that confronted Joffre and French; in particular aircraft ere nullifying the effects of the superior German artillery. And was this factor, in particular, which enabled the French High ommand to remark, in a dispatch published March 30, that recent operations around Beausejour and Perthes show that at given point, and a given hour, we are free to do what we will."

Summed up, the conclusions which may be drawn from this brief statement are as follows: The Allies, lacking in reinforcements and necessary supplies, far from being able to take advantage of this slackening off of the German offensive, were hard put to it to maintain their own front intact. Then, quietly, unobtrusively, suddenly—as all things happen in the air—the longed-for superiority of the battle-lines had fallen into their hands from the heavens. The airmen dominated the battle situation.

The ordinary artillery bombardment, directed from the air, developed at once into a mercilessly accurate barrage. Did such barrage precede an Allied infantry attack on a large scale? The Germans, always on the *qui vive*, took no chances. If it was required to draw a German reinforcement from west to east, or *vice versa*, it was only necessary to send a few aeroplanes up scouting overhead, and develop such an attack. The effect would be instantaneous. Troops would be rushed up by the German Staff to meet the—presumed—offensive. And they would go on spending their men in wasteful counter-attacks, on pain of a loss which would presently compel a concentration to the rear.

By now we in Britain had realised the extreme importance of the air service in war. It was realised that we could never afford to allow this advantage to slip from our grasp. We must go on building and perfecting aeroplanes and training pilots with all possible energy. For the time being, though the German propagandists strove desperately to prove otherwise, we had established a very real ascendancy in the air.

That the Allies' bid for the mastery of the air on the western front had not been gained easily and without sacrifice must be obvious. The losses in the "personnel" of the German Flying Corps, however, were more serious, and particularly so when taken in conjunction with the amount of work accomplished. The losses in the field divisions up to the end of August were: Killed or died from illness or wounds, 187; wounded or injured, 130; prisoners or interned, 58; missing, 63; giving a total of 438. In the Bavarian Flying Corps the casualties had been 1 killed, 1 missing, and 6 wounded, while the number of casualties in the Reserve were 10, of which 9

had been killed and 1 wounded. Thus the grand total was brought up to 456 for the German air services.

Despite this palpable fact, says a German official "communiqué" of October 6, 1915: "In the English report of October 1, it was stated that the English had gained the upper hand over our aviators in aerial battles. With regard to this, the following resumé gives the best information:

"In the month of September the losses in German aeroplanes amounted in aerial battles to three, two are missing, and owing to bombardment from the earth two were also lost; in all seven aeroplanes. In the same period in aerial encounters the English lost eight aeroplanes, and the French twenty-two—a total of thirty aeroplanes."

France Replies to German Boasts

Unfortunately for the optimists of Potsdam, the French Government saw fit to reply to this announcement as follows: "These totals are open to dispute. The figure which concerns us exceeds by more than one-third our true losses. As to the German aeroplanes, during the course of last month we have seen more than seven fall, some in their own lines and some in ours, in an obviously helpless condition; but even that is only one side of the question.

"A comparison of the losses suffered does not permit of any serious conclusion if it is not accompanied or corrected by a comparison with the amount of work accomplished and with the results attained. Our scouting squadrons are active and daring, our chaser aeroplanes are always ready and thirsting for battle. The German aviators, on the contrary, manifest on every occasion a discretion which is imposed upon them by strict injunctions.

"One can judge of this fact by the following order emanating from the Headquarters of the 8th Reserve Corps, No. 19,635, of August 28.

"'These battle aeroplanes should only take the air to fight the aeroplanes which have crossed the French lines. They are ordered not to cross the lines themselves under any pretext.'

"The terms of this order tend to show, perhaps (1) That the German aviators have in the past suffered substantial losses;

(2) that the High Command does not care to expose them to losses still more substantial; but it is difficult to find here a proof that the mastery of the air belongs to the Germans."

The Germans, however, still refused to admit their defeat. "The belief of the French in the great superiority of their aeroplanes was a pretty error, with which they deceived themselves until the war brought the great test," said the *Kreuz Zeitung*, the German military journal, a few days later. "In East and West our aeroplanes have shown that they meet all the requirements of war, and our airmen, who before the war were, according to the French, not worth considering, have done so brilliantly that a great part of them have already been decorated with the Iron Cross of the First Class. The war has proved the true value of our aeroplanes, as Paris itself knows. The reason that, in peace time, people believed in the superiority of French air-work was that the French boasted about every success, while we did honest and successful work without looking for applause. The splendid achievements of our airmen when war broke out produced almost as great surprise in France as did our 17 in. howitzers."

From the enemy hypothesis, every form of aerial activity was justifiable; was more, an essential item of the battle programme. A moral effect was the constantly recurring cant of the result of his raids on unfortified towns and cities. It was not even moral in its unmoral, outspoken disavowment of the few decencies of war. In the majority of his raids the German hoped rather than achieved. Occasionally fortunate, his success was regarded with open disapproval by the neutral world. A certain incident connected with an attack by bombs on the steam trawler *Gravenhage* by no means endeared the enemy air service to the Dutch. The *Gravenhage* was bombed by a German aeroplane over the North Sea early in May. The vessel was in longtitude 53 deg. 30 min. north, latitude 5.20 deg. east, and was flying the Dutch flag. Three bombs were dropped from the Taube.

"We hope the German military authorities," said the Danish *Ribe Stiftstidende*, on June 10, referring to the recent visit, at only forty metres above the ground, of a German aeroplane over Esbjerg, "will instruct their aviators not to fly over

neutral territory, as the aeroplanes of belligerent Powers should have nothing to do in neutral countries, and we trust our Government will call the German Government's attention to the matter, pointing out that similar flying excursions will not take place in future without risk to the passenger and their machines. In neutral Switzerland they shoot at them without ceremony."

Early in 1915 the Russian Government decided to treat every German airman who raided open towns as a murderer, and deal with him accordingly. As the *Novoe Vremya,* one of the former Russian Empire's leading newspapers, pointed out: "Legal reprisals are the only means in our hands when fighting against German savagery. We cannot reply by the same acts, nor is it any use to threaten. Let us take advantage of this incident to pass from words to deeds. Whatever the sentence passed, we should communicate it to the German Government, with the notice that the Allies will so act whenever the laws of war are broken. Perhaps, when they know that their officers run the risk of dying shameful deaths as criminals the heads of the German and Austrian Armies will cease sending them against peaceful inhabitants of undefended towns."

The Russian Way with Town Bombers

In April the increased activity of the enemy aviators over a considerable extent of the Russian front excited another outburst against German brutality. While Russian aviators were employed solely against military structures, or such as had a military value, like bridges and railway stations, as well as war stores and the like, the German aeroplanes had been particularly busy dropping bombs, not upon places where any military purpose could be served, but upon crowded town districts, especially—as was the case at Bielostok—in the poorer quarters, where the sufferers were exclusively the most indigent class of Jews. "Raids by German aviators," said a semi-official statement issued in Petrograd, April 22, "which have become more frequent, cause almost no damage among our troops; but, when their bombs fall in quarters of a town where there is a dense population, principally Jewish, as at Bielostok, then the raids cause much loss of life. Hitherto our aviators have con-

fined themselves exclusively to the bombardment of military works and troops. However, in view of the Apachism of the enemy airmen towards the peaceful inhabitants of Gechanoff, Ostrolenko, Lomja, Bielostok, and other populated places, they will be forced to begin reprisals."

Curious beyond understanding was the German view of this matter of air-raiding. After the French reprisal raid on Karlsruhe, the Grand Duke of Baden sent the following telegram from the front to the Burgomaster of Karlsruhe :

"The Kaiser telegraphs me his deep indignation at the wicked attack on beloved Karlsruhe. The poor, innocent victims among civilians have greatly distressed him."

At the same time a telegram from Berlin tried to discredit the French airmen by declaring that they were doubtless aware that in the Castle of the Margrave, which was considerably damaged, were the Grand Duchess Louise and the Queen of Sweden. The telegram said that several splinters flew into the room of the Swedish Baroness Hochschild, and the children of Prince Max of Baden, the roof of whose bedroom was demolished, only narrowly escaped.

And with regard to the British attitude and practice with regard to the war in the air?

The Turning Point of the War

The summer of 1915 was the turning-point in the war for British arms. For all time, the daring individual proved superior to the most intensive machinery in the history of the world. And this is how it came to pass.

Forty-six years before a German Chancellor had returned home from Vienna, the ink of the "peace with honour" treaty yet almost wet in his pocket, and dreamed a great and ambitious dream. Sedan and Paris were but losing hazards to this great gamble of world-dominion that was to come. However, Time, that arch-enemy of mankind, was to gather the inventor home well before his scheme could bear fruit. Realisation, when he was long dead but not forgotten, was to be frustrated, not so much by the glorious deed of one man, but the spirit that it represented.

The "Iron" Chancellor passed the way of all flesh. The

evil genius of the man, however, outlived him. Confided most religiously with the great secret, his successor built and added, handing down in his turn the gigantic substance of a great idea. So each in turn, here and there a little added, gathered up the tangled skein of a scheme that was to strike at the very heart of civilisation, awaiting the day of the master-mind that was to put it into operation. He was to be a German among Germans; eternal in his fame. However, such is the vagary of this life, the fruits of the strong were garnered by the hands of a weakling. This man's failure is now a matter of history. His name was Bethmann von Hollweg.

When, at that last historic meeting with the British Ambassador to Berlin, with the salt tears in his eyes, he declaimed dramatically against the foolhardy allegiance of the foolhardy English to that "scrap of paper," that would make war inevitable, he was playing a part. Fortune, that day, appeared too kind to him. It seemed almost ridiculous, the ease with which Bismarck's, and Germany's, great ambition at last was to be realised. That ambition could be summed up in four words—the invasion of England.

So it came to pass. The German main Headquarters, warped by this one fanatic idea, gave willingly the cream of its manhood and the best of its brains to the new German naval front of the Belgian coast. From thence was to be struck the last shattering blow at the heart of hated England. Night and day their efforts on the new bases, dumps, and defences never slackened. Searchlights, guns, and aircraft were rushed down from the Fatherland during the long winter months from November to March. Troops, the finest divisions and corps of the enemy army, were concentrated along the shores of the North Sea, in overwhelming numbers. Hundreds of workmen were imported from Germany. And when their efforts proved unavailing, the unfortunate inhabitants were pressed into service. Dismembered and transported overland by railway truck and motor lorry, came innumerable submarines, to be set up at Bruges, Zeebrugge, and Ostend. Slinking cautiously down the Dutch coast, they were shortly joined by squadrons of Germany's latest destroyers. And escorted by these destroyers—significant fact—were hundreds of flat-bottomed

boats of an unusual construction, capable of transporting a great army of men overseas. By midsummer but a word was needed. The German desires were almost won—almost!

Again the enemy had underestimated the intelligence of the British High Command. Again, quietly smiling to themselves, the British were able to gain a handsome victory at the price of his superiority. As long since as December, 1914—so well were we served in this most vital department of war—the full text of that great German plan had been in the hands of the British War Office. Though forewarned, however, we became faced with the greatest problem of the war. The Belgian coast was inaccessible from the land. An impassable steel wall of a million and a half bayonets blocked every road. From the North Sea the coast was equally inaccessible. The enemy, with great foresight, had strewn the water surface with hundreds of floating mines from as far east as the Frisian Islands, that outer guardian wall of sea-swamped Holland, to Nieuport, rather west of which town the hundred-miles-long trenches stopped abruptly on the foreshore. The way of the air alone remained. Flying, however, was still serving its desperate apprenticeship. The air had not proved itself yet in the eyes of the older military commanders. To entrust the air services with so stupendous a task was too great a gamble, but it was a gamble that in the end had to be played.

War, which despises precedent, allows no happy medium between glorious success and disastrous failure. The die, however, was cast. Almost with trepidation the British Chiefs awaited results; the airmen had been entrusted with the gigantic task of frustrating the German invasion of Britain. Where the home output of aeroplanes proved insufficient, it was bolstered up with generous additions from the French and Americans. Pilots and observers, well-trained and eager youths, by squadrons, were dispatched post-haste for Dunkirk, to relieve their greatly overworked predecessors of the winter months. To block, and when possible destroy, the enemy road and railway lines of communications; to bomb his hut encampments, troops concentrations, and ammunition dumps; and to destroy beyond all repair the destroyer moorings and submarine bases was their particular mission; and, above all,

to glean every possible scrap of information concerning the enemy movements.

During just such a reconnaissance flight (July 31, 1915) occurred Captain Liddell's great deed, that was to win for him a much-coveted Victoria Cross, but to cost him his life. Ostend-Bruges-Ghent was his patrol that midsummer's afternoon. It was a day never meant for the grim and bloody business of war. Overhead the sky arched a boundless waste of agate-blue, pocked here and there, like old Dresden-ware, with fantastic curling wraiths of clouds of filmy-white hue. Hundreds of miles to the horizon, the surface of land and sea alike showed up in plainest detail. But favourably as such conditions lent themselves to duties of observation, no less valuable did they prove to the enemy's anti-aircraft gunners. When he was mid-way between Ostend and Bruges—twenty miles across the lines—a shrapnel shell burst violently against the side of Liddell's machine, badly smashing the control wheel and throttle control, and shattering his right thigh.

Magnificent Heroism

The remainder of this great flight beggars description. Momentarily losing consciousness, his machine pitched down giddily in a headlong dive, 3,000 feet. The upward rush of air from that desperate plunge served to bring him round from his death-like faint. Only then recovering himself by an almost superhuman effort, weak and exhausted by the sudden loss of blood, suffering excruciating agonies from the gaping wound in his side, and fired at incessantly from all sides, not many men could have stood that terrible strain. But Liddell grimly set his teeth and hung on. He was determined to prevent himself and his observer from being taken prisoner, and the valuable information which they had gleaned from falling into the enemy's hands.

A quiet, undemonstrative youth, with his shy manner and studious ways, John Aidan Liddell was the last man one would have considered capable of such heroic determination. In him the world—research and analytical work were his bent—lost a potential scientist of the first rank; a great leader of thought; the Flying Corps and his country a very gallant gentleman.

His was one of those rare characters which chose to give rather than to ask, and in the giving know neither fear nor despair.

Five times on that gruesome, homeward flight he fainted dead away. On as many occasions only an unusually self-disciplined mind triumphed over an overwrought nature.

Eventually he landed his machine well within the British lines—half an hour after he had been wounded—as deftly and as neatly as though returning from some practice flight.

He was carried immediately to the neighbouring hospital of La Panne, and was recommended—unusual honour—the same day for the V.C. But Liddell knew himself that he would never live to receive it. Even so his dauntless spirit would not be denied. As he lay dying of septic poisoning he wrote his mother in England: "Mummy dear—Don't be alarmed at my little escapade; will be all right again soon and be with you. . . . Poor Jack!"—his observer—"What an awful time he must have had after I fainted and we were nose-diving for the ground. . . . P.S.—Don't go talking about this business"—the award of his V.C.—"to all the old dowagers of your acquaintance."

A month later to the day, in spite of the hope that his life might yet be saved, Captain Liddell flew west; a great airman, of whom even an unemotional announcement of the *London Gazette* found words to admit: "It would seem incredible that he could have accomplished his task."

Such men it was who, in the first year of war, made the glorious traditions of our young Air Service. Their spirit grew and multiplied until it became invincible.

CHAPTER II

THE HOME AIR FRONT

Rumour and Exaggeration—Preparing Britain for the Air War—Neutral Comment and Indignation—Justification of Air-Raids—British Airmen in Training and Aircraft Production—London's Aerial Defences—Pen Sketch of the Metropolis during a Zeppelin Raid—Zeppelin Raids of 1915.

THE first twelve months of the German air war on Great Britain is not a very splendid period of our history. For the first time for centuries the sovereignty of the British Navy had been challenged; an enemy had crossed the English coast-line. The first foe since von Tromp, the Dutch admiral of the seventeenth century, if not actually setting foot on English soil, had at least succeeded in carrying out warlike operations on the British capital and on British homes. First the audacity of these early attacks raised the latent fury of our national temperament. Such impudent daring, the knowing ones said after the first Zeppelin raid, could not be repeated. The enemy would be made to pay most dearly. The British aerial defences had been caught napping. The visit would not be repeated. British airmen—"swarms of hornets"—could beat off any number of giant airships that the enemy cared to send over. The Zeppelins, however, came again and again. Each time they appeared to get away scathless. Anger and curiosity developed into the most exaggerated rumours and the wildest sort of panic. Britain—rather the civilian population—lost its head.

Of all responsible public men, a Member of Parliament went down to the House of Commons one fine day, and refused point-blank to believe the Home Secretary's assurance that the enemy visitors were not aided materially in their visits by German spies displaying guiding lights in lonely spots on the East Coast. According to this member, no less than twelve mysterious motor-cars were rushing round the east of Norfolk

on the night of one of the raids. The local police, he inferred, had been ordered not to answer his questions. Six of these enemy agents were operating at midnight in one locality, in the neighbourhood of which the bombs fell. In another place two cars visited the lower part of a village, one immediately before and one immediately after the raid, and both excited suspicion. Again, within twenty minutes of each other, three cars dashed through another village, the last one closely followed by a Zeppelin. And here, said this worthy gentleman, is the statement of a witness:

"On that particular night I was in my home in Brancaster Staith. About 10 P.M. I heard a Zeppelin passing over the house. It remained some minutes over the field adjoining, as if uncertain about something. A motor-car with the most brilliant headlights imaginable then rushed along the road from Deepdale towards Brancaster, and when by the side of the field mentioned above the occupants all shouted very loudly, and two small lights were flashed as a reply from the Zeppelin. Then the latter travelled off after the motor-car. I saw the headlights and heard the shouting, but did not see the two lights from the Zeppelin, as I was in front of the house; but the lights were seen by other occupants of the house."

In the face of such statements from the lips of a public man it is not to be wondered at that the public in general were seized with something remarkably like panic. The truth was that they had not yet got the matter of air raiding in its right proportion; they did not realise that the aircraft had carried modern war far beyond the limits of the firing lines into the very hearts of the belligerent countries. In this new war by air every man, woman and child was as much on duty as the soldier in the trenches. However, if the public were slow to appreciate the real meaning of aerial warfare, the authorities were well prepared.

One of the most significant phases of the home campaign is that, on August 2—two days before the declaration of war—the Home Secretary had issued the following public notice: "I prohibit the navigation of aircraft of every class and description over the whole area of the United Kingdom, and over the whole of the coast-line thereof and territorial waters

adjacent thereto. This order shall not apply to naval or military aircraft or to aircraft flying under naval or military orders, nor shall it apply to any aircraft flying within three miles of a recognised aerodrome." No more drastic regulation had ever been enforced in Britain. Every sort of flying was curtailed in twenty-four hours. No aeroplane or ship could leave the ground without the permission of some competent military authority. The knowledge of this fact brought the stern reality of the war closer home to the civilian population than even the crossing of the British Expeditionary Force. They little realised in those days that that long arm of the war, the aeroplane, was unavoidable practically in every corner of the British Isles. However, the aviation commanders realised the fact. The country was cleared for action much in the same fashion as a battleship going into action at sea. There must be no chance for mistakes.

Preparing for Raids

Early in September, 1914, the notice of the public was called to the possibility of messages being dropped from aeroplanes. These messages were to be enclosed in weighted canvas bags, attached to which were two streamers of blue, red and yellow cloth. Any person finding such a bag was ordered to open it immediately and forward the enclosed message to its destination without delay. This practice, however, failed to materialise. As a precaution against spies, early notices were issued to the effect that all army sentries at seaplane stations, or within the locality of the base, had strict orders to challenge once, and if not instantly obeyed to fire. This order also applied to wireless stations.

A national scheme of aircraft insurance was put into operation by the Government in the summer of 1915, by which people on the East Coast obtained at 2s. and 3s. per cent. that for which they had been paying before as much as £1 per cent. After some considerable discussion in the House of Commons it was decided that the Government's new scheme of paying compensation for injury caused by hostile aircraft would apply to personal injury or loss of life as well as to injury to property. Quite early in the Zeppelin raid period

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the Commissioner of the Metropolitan Police issued a notice recommending adventurous Londoners to keep under cover. This warning was highly necessary, for, attracted by the novelty and sensation of an air-raid, crowds of people had at first thronged the streets while the bombs were dropping and the anti-aircraft guns were still in action. To meet the possibility of incendiary fires the householder was advised to keep a supply of water and sand readily available. The Commissioner took advantage of the situation to warn the public against the many spurious fire extinguishers that were being unloaded on the market at the time of the first panic. Experiments were made at the instance of the Commissioner by a competent committee of experts as to the most favourable appliances for effectively controlling fires such as were likely to be caused by bombs, explosive or incendiary. "The Commissioner was advised as a result of these experiments that the provision, and prompt and intelligent use, of water or sand or both, in dealing with such outbreaks of fire was the best, simplest, and most economical safeguard."

A large printed public warning, that was posted on walls, railway stations and tube railways, early advised people to familiarise themselves with the appearance of British and German ships and aeroplanes, so that they would not be alarmed by British aircraft, and could take shelter if hostile aircraft appeared. "Should hostile aircraft," said this notice, "be seen, take shelter immediately in the nearest available house, preferably in the basement, and remain there until the aircraft have left the vicinity; do not stand about in crowds, and do not touch unexploded bombs.

"In the event of hostile aircraft being seen in country districts the nearest Naval, Military or Police authorities should, if possible, be advised immediately by telephone of the time of appearance, the direction of flight, and whether the aircraft is an airship or an aeroplane."

Beneath this notice appeared a large coloured block of the various types of British and German airships and aeroplanes.

Twenty-three Zeppelin raids were made on Great Britain before October 13, 1915, in which the casualties were 181 killed and 455 wounded.

The Home Air Front

Possibly no development of war has ever roused such widespread controversy as did the introduction of the air raid. Neutral countries openly and pointedly expressed their opinion as to the "barbarity" of this latest form of warfare, while America looked on aghast. "There is no glory in it," declared the *New York Sun;* "it stimulates recruiting among the people outraged; it offends the moral sense of neutrals everywhere and alienates them. Therefore it is an amazingly stupid as well as a barbarous kind of warfare." The *New York Tribune,* in the course of an editorial on the subject, expressed regret that: "A great step forward in civilisation like the invention of aircraft should be seized on as a pretext for ignoring the limitations of civilised war codes, and for going back to the wanton brutality of three or four centuries ago.

Neutral Opinion on Zeppelin Raids

"The fact that the invaders use airships does not relieve them from the restraints of civilised war. Such an attack does not differ in its essence from an attempt to massacre non-combatants. Civilisation revolts at the relapse from humane military methods which the war has shown to be setting in, and will eventually find some means of stamping out the recrudescence of brutality which subjects women, children and male non-combatants to the same treatment as armed men."

The German Press carried out a really excellent defence of their latest service. Officially inspired, the *Tageblatt* indignantly remarked: "England has no right to be indignant, as her flying machines and ships in broad daylight attacked open towns such as Freiburg, Dar-es-Salaam and Swakopmund.

"Air war is acknowledged to be a means of modern warfare as long as it is carried out within the rules of international law. This has been done by our dirigibles.

"The German nation has been forced by England to fight for her existence, and cannot be forced to forego legitimate self-defence, and will not do so, relying upon her good right." In further justification, the *Frankfurter Zeitung* later went to the trouble of publishing a map of the outskirts of London—Die Festung London—and explaining in full detail the "fortification works of London."

Die Festung London.

This map, which was published in the German newspaper, the *Frankfurter Zeitung*, purports to show the defences of London. It was used to prove to the German people that London at the time of the raids was not an undefended city.

"London," said the *Zeitung*, "like every modern fortress, is provided with a line of fortification works which, placed at a great distance from the city, are intended to defend the latter from hostile bombardment, and protect its important barracks, depots, factories, harbours and docks.

"Before the existence of our superior air weapons the bombardment of London was possible only from land or sea. By water bombardment could only have been carried out by enemy ships which could pass the Thames mouth. Therefore the fortifications, which are to defend London against sea attack, are grouped round the mouth of the Thames.

"The Fortifications of London"

"To these belong, in the first instance, the works at Shoeburyness, east of Southend, and the works liberally furnished with guns south and south-west of Southend. On the sea side of the Thames then come the defended ports of Sheerness with the Barton Point fort, the Garrison Point fort, and the lines lying between. The works then extend along the right bank of the Medway, and bend southerly around Chatham and Rochester. Other works follow the line of the Thames on both banks to London. The names of these are specially well known—Slough fort, Hope Point fort, Coalhouse fort, as well as Tilbury fort and the New Tavern fort at Gravesend. Other batteries are mounted at Purfleet and upstream as far as Woolwich Arsenal.

"The works defending London on the land side are built in the form of a one-sided bridgehead from the Thames west of Gravesend, extending in a large arc south of London into the region south of Reading. There are forts at Farningham on the Darent river, north-west of Sevenoaks, north and north-west of Westerham, at Redhill, Reigate, Dorking, Guildford and Aldershot. This tabulation only concerns works which were already built in peace time. In addition, there are all the numerous works which have come into existence round London during the war."

Judging from the highly detailed and accurate information of the London defences displayed by a provincial paper like the *Frankfurter Zeitung*, it may be gathered that the enemy com-

manders were not lacking in information of a military nature. That such defences did exist, meanwhile, it would be idle to deny. Then, ridding ourselves of the views expressed by the Press of the various nations of the world, who, after all, knew little more about war and rather less concerning the war in the air than the man in the street, was air raiding legitimate? While stating definitely that it was, three good reasons can be given. As is proved beyond all doubt in the previous paragraph, the enemy were well aware of the military points it would be to their best advantage to attack. Harmless civilians were bombed more by accident than design. Not that the enemy would have entertained any scruples against such a course, but simply because his bomb-dropping was so inaccurate. Three definite and invaluable results were obtained by the Germans in raiding our own country. First, there was the military result achieved. London was the largest munition centre in the world; it was the clearing house for all military transport passing between the British Isles and the north of France; and it was better defended with anti-aircraft guns than any other position in the United Kingdom. To deny, then, that London was a military defended town is absurd; and by striking at the heart of the military organisation the enemy struck a vital blow at the lines of communication of our armies in the field. At the same time he was achieving a great victory in the air by bombing and dislocating the British aeroplane factories and training establishments.

The aircraft industry by this time had become all-embracing in Great Britain. New factories were springing up on all hands, new aerodromes being built in almost every county.

Though as yet we had evolved no battle-worthy aeroplane—the Field-Marshal had remarked in his last dispatch: "We have been indebted to our Allies for supplying us with aeronautical material without which the efficiency of our Royal Flying Corps would have been seriously impaired"—and no efficient aero-engine, the National Physical Laboratory had already carried out innumerable and invaluable investigations. An increased volume of work had been dealt with relating to airship and aeroplane fabrics, methods of proofing, and dopes. New apparatus had been constructed for carrying out strength

tests on larger specimens of fabric, and for reproducing in the laboratory the conditions of weathering tests.

A large number of cases of fracture of aeroplane parts, especially of parts of engines, had been investigated at the request of the Admiralty and the War Office. Reports relative to the strength of machines had been presented to the same departments, and recommendations had been made with a view to securing, wherever possible, increased strength in the construction of aeroplanes.

The investigation relating to the stability of the aeroplane had been extended. A large amount of attention had also been given to improvements in the aeroplane in detail, both from the aerodynamic and constructional points of view. And important additions had been made to the equipment for experimental work at the National Physical Laboratory. A large air channel, recently completed, was now in use. This channel was 7 feet square in section. In this an air speed of 65 feet per second could be reached, with a consumption of about 60 horse-power. The balance for the measurement of the forces and the moments on the models tested was constructed by the laboratory staff, and the accuracy with which the observations could be made had been found satisfactory. Three air channels were now available for investigations on models, and provision had been made for the necessary increase in the staff to enable advantage to be taken of the facilities thus afforded. The volume of the work to be carried out continued to grow, and all the channels were in practically continuous use.

Getting Ready for the "Big Air Push"

The Royal Aircraft Factory at Farnborough had already completed several new machines since the outbreak of hostilities. And now, finding the factory unable to cope with the work, plans and specifications of the planes were sent out to commercial constructors. Thus very soon almost every trade in Great Britain was embraced in aircraft manufacture. Special plant for the making of aeroplanes and spare parts had been laid down in innumerable factories, where, before the war, even motor-cars had not been manufactured. Almost immediately there was a great demand for favourable wood.

Every firm of aeroplane manufacturers employed their own expert for the purchase of wood. Considerable motor transport was pressed into service for the collection and delivery of materials to the various factories, which, by now, were strewn broadcast throughout Britain. Metal, embracing as it did steel cables and wires, bolts, nuts, wire strainers, sheet metal work for engine cowls, petrol and oil tanks, steel tubing, stampings, forgings, chains, sprockets, gear wheels, etc., played a great part in the new industry; while specially skilled workmen were required for the manufacture of instruments as carburettors, magnetos, sparking plugs, accumulators, self-starting instalments, wheels, tyres, shock absorbers, etc. Coach-builders were in great demand for the construction of fuselage. Petrol and oil, in great quantities, had to be imported from America and Russia. Various minor trades were brought in also, as those associated with the manufacture of dopes, varnishes, paints, glues and fabrics. By this time anti-aircraft gunnery had achieved some sort of accuracy in firing; also sundry common-sense precautions had been taken in the normal life of the nation.

Admiral Sir Percy Scott, the well-known naval gunnery expert, was at first put in charge of the aerial defences of London. But, after a few months, the defence was taken over in its entirety by the War Office. As early at September 11, the Admiralty issued an order forbidding the use of brilliant lights on piers, esplanades and public places which were visible from seaward or from the air. The ringing of church bells was prohibited in all towns throughout the United Kingdom; also the striking of church clocks. And on December 24 the Home Office issued the following order with regard to the reduced lighting regulations:

"(1) The lighting-up time for all vehicles is to be half an hour after sunset.

"(2) The requirement to carry lights is extended to all vehicles using the roadway, including vehicles drawn or pushed by hand; and

"(3) All vehicles are required to carry a lamp showing a red light to the rear, and a separate lamp carried at the rear is made compulsory for all except hand vehicles."

These regulations undoubtedly served to baulk the Zeppelin commanders in their landmarks.

As became customary later with these Zeppelin raids on London and the East Coast—but one visit was paid in the first year to any area north of the Wash, and that the April 14 raid on Tyneside—the period of greatest activity was in the autumn. Between September 7 and October 13 no less than six large raids took place. The shorter days and moonless nights were eminently suited to the doings of the prowling airships, which, unseen themselves, had little difficulty in sighting their objectives. Moonless nights in London were soon a matter of common dread; a general fear, the analysis of which offers a most interesting insight into human psychology.

At 6 P.M., let us say, the business of the city would be proceeding quite normally. The streets would be thronged with homeward-bound pedestrians. The customary incessant stream of traffic would be flowing west, towards the pleasure centres of the West End. Theatres and restaurants would be crowded with all their usual noisy, merry crowds; though, perhaps, in this case, merry is somewhat the wrong adjective. Faintly rumoured earlier in the evening, the insidious whisper had gone round that Zepps might be expected! As though by common impulse, men grew unnaturally boisterous; women affected a reckless hilarity, which they were far from feeling. It was a curious fact that the temper of the waiting crowd was rather one part fear to three parts hysteria. And in this respect the men were often worse offenders than the women.

London on a "Zepp Night"

Came a spell; a brief, undefinable quiet, when the whole life of the city suddenly seemed dulled. Then, with a furious burst, pent-up human nature would burst out in every manner of minor excess. This boisterous merriment and rippling gaiety was well at its height when, suddenly, a grim warning from the heights of the black sky overhead, and far across the eastern sky some distant, unseen gun would boom into action. Its effect would be electrical. A tense, compelling silence grips all vitality for a brief half moment of realisation. Then cries, shouts, wild laughter, piercing shrieks of police whistles

and the louder blast of innumerable sirens would rend the air in one sharp deafening chorus. The roar in the streets grew and grew in volume, as every imaginable kind of vehicle and sort of human being hurried pell-mell to the nearest shelter. Imperceptibly men's eyes lighted with new, strange anxiety; every woman, imperceptibly, appeared more hurried in her movements. And, meanwhile, sinister and insidious, the warning roar of the guns rolled ever nearer and nearer.

At first hearing, the sound had been more that of the rollers of an angry sea breaking on some distant shore: a distinguishable, well-punctuated series of sounds. In turn, however, this now gave place to an angry snarling and growling; a sound which lashed itself up into one single, incoherent fury as the guns on all sides burst into action overhead.

Now the sky became lit with a savage fury of piercing red, and gold, and grey; wee fiery balls of colour, that bit murderously into the treacherous darkness overhead, where the only relief was the tall slender columns of the inquisitive searchlights, sweeping gracefully to and fro, and lighting up the neighbouring surface of the earth with an instant, unnatural glare. The streets, by this time, were as empty as the middle of the night. The silence between the bursts of firing is almost deathlike. The conscious feeling of the eight million human living souls of the greatest city in the world all below ground, like rats in their holes, baffles description. But it is as nothing to the eerie vibration of the earth, which gives and trembles incessantly to that pandemonium of high explosive overhead, punctuated almost unbearably with the spasmodic thud, the blinding flash, and the thundering roar of the falling bombs. The raid has begun. Involuntarily, one's only wonder is: Where have they dropped? What have they hit? What poor, helpless human being has been blown to atoms in that moment of agony? It was a sensation never to lessen, however many such raids were experienced; and no one differed from any other in the sequence of emotions which it aroused.

On the night of Tuesday, May 31, London was first swept by this vague, unnameable terror. At last, after many desperate attempts, the Zeppelin commanders had reached the capital. Nine similar and previous visits had been paid; and many

thought that London was inviolable. That tragic night was to bring its own disillusionment. It was the enemy's reprisal raid for the "bombardment of the open town of Ludwigshaven"; and resultingly they claimed to "have dropped bombs on the workshops (or wharves) or docks in London." About ninety bombs, mostly of an incendiary character, were dropped from the raiding Zeppelins that night, in various adjoining localities. A number of fires broke out, but these were promptly and effectively taken in hand. No public building was hit, though a number of private premises were damaged by fire or water. And the casualties were small.

It was not until the raid on the East Coast, which occurred on August 9, that an enemy Zeppelin was hit by the anti-aircraft fire. In this case one of the craft was seriously damaged by the gunfire of the British land defences, and had to be towed into Ostend. There she was afterwards subjected to continual attacks by aircraft from Dunkirk under heavy fire, and, after having had her back broken and rear compartments damaged, she was completely destroyed by explosion. And the first official reference to the employment of British aeroplanes in the anti-Zeppelin defences appeared in the Admiralty's report of the September 7 raid, again on the Eastern Counties. Three Zeppelins were in action that night; aeroplanes that went up, however, were unable to locate them. Fifteen small dwelling-houses were demolished in one locality by a single bomb; and the number of casualties was as high as 56.

For a week now England was raided almost every night. The following night (September 8) hostile aircraft visited the London district and the Eastern Counties, dropping incendiary and explosive bombs, and killing 20 and wounding 86—all civilians. A raid, which, according to the German Main Head-quarters, "attacked with good results the western part of the city of London, great factories near Norwich, and the harbour works and iron works at Middlesbrough"; which, after all, only serves to show that the enemy was not blameless in his veracity.

In the October 13 raid on the London area and the Eastern Counties, in which five aeroplanes of the R.F.C. went up, only one aeroplane succeeded in locating an airship owing to

the atmospheric conditions. The Germans claimed to have demolished the London docks, while the British account of the same operation was that: "Some houses were damaged and several fires started, but no serious damage was caused to military material."

The principal Zeppelin attacks of the year 1915 were as follows:

Date	*District*	*Killed*	*Injured*
Jan. 19	Yarmouth and district	4	9
Feb. 21	Colchester and district	—	—
April 4	Tyneside	—	2
„ 15	Lowestoft and East Coast	—	—
„ 16	Faversham	—	—
„ 29	Ipswich and district	—	—
May 10	Southend	—	—
„ 16	Ramsgate	1	—
„ 27	Southend	3	8
„ 31	Outer London	6	—
June 4	East Coast	24	40
„ 6	East Coast	5	40
„ 15	North-East Coast	16	40
July 3	Harwich	—	—
Aug. 9	East Coast	15	14
„ 12	East Coast	6	23
„ 17	Eastern Counties	10	36
Sept. 7	Eastern Counties	13	43
„ 8	London District	20	86
„ 11	East Coast	—	—
„ 12	East Coast	—	—
„ 13	East Coast	—	—
Oct. 13	London area and Eastern Counties	56	114

CHAPTER III

THE GREAT GERMAN RECOVERY

Development of the Organisation of the German Air Service—Engine Power *v.* Man Power—Enemy Spies and Aircraft—Countering the Allies' Aerial Offensive on the Rhine—The Mobile Squadrons—Aerial War on Russia—Headquarters Staff at K——,—Violation of Neutral Territory—The Kaiser's Narrow Escape in a Zeppelin Voyage—The German Speaks.

Of all the five years of war that of 1915 was most favourable to German arms in the air. Never before, never since has the enemy enjoyed the same supremacy in aircraft. For many months the "Fokker" machine had dominated the aerial situation over the battlefield; the Zeppelin, for the time being, proved itself invincible to all opposition. German planes were carrying the air war to London and Paris, and into the heart of Russia, alike, most effectively. The aviation corps had been reorganised throughout and placed under the command of a most capable and youthful leader, General von Hoppner, who had early distinguished himself as Hindenburg's Chief-of-Staff. The pick of the enemy aviators, Boelcke, Immelmann, and von Richthofen that year were all fighting desperately for distinction—unknown, youthful aviators. Their spirit of grim resolution and reckless daring was contagious throughout the service. Aerial "circus" operations that were to benefit the enemy so greatly in the years that were to come had already a most promising beginning. The Allies' air offensive on the vital German military and munition centres, and harbour works, and aerial bases in Belgium at last was held in check. Altogether the future of German military aviation had never promised so well as in the closing stages of 1915.

A great lesson had been learnt, and a great development made in Germany regarding the personnel of the aviation squadrons. Quite early wise brains had realised the possibility

—unusually great for the enemy's centralised effort of war—of the influence of the air on the main battlefield. Also it was realised that, with the unusual attractions that flying offered, the best blood of the nation could be attracted to aviation without an effort. The air service in Germany very soon became the most fashionable corps. Most of the German flight officers were young men of good social standing, all the observers being officers. At Johannisthal, near Berlin, was established a great school of aviation through which the majority of them passed before qualifying for active service. This training consisted of flying observation, use of machine-gun, bomb-dropping, photography, wireless telegraphy, and a special course in the air of shooting on hostile aircraft. All observers had to pass a standard test before being sent up on a reconnaissance. In fighting a general policy for all battle pilots was early developed. Unless it could be avoided, the order was that no German airman should engage with a hostile aircraft except on his own side of the lines, and within the protection of the German anti-aircraft guns. In this manner, perhaps, they gained a more than temporary supremacy, for our men would attack on every possible occasion, even against odds, a practice which was soon discountenanced by the authorities. While it lasted the enemy gained many easy victories over Allied aviators. In one case, for instance, a British pilot attacked a couple of enemy machines single-handed. They immediately made off for their own lines. And the Englishman, following too recklessly, was shortly afterwards trapped by three further enemy planes and driven to earth.

Aviation, however, is no more a matter of man-power than is a game of cricket. You may have all the finest cricketers of the world on one side and yet not prove successful if the combination is lacking. In the same way co-operation is the first law of successful aviation. The enemy did well, after having developed the personal prowess of the pilot, to provide him with new and more airworthy machines, with which it was possible to practice his newly developed manœuvres to a degree not yet believed possible in flying.

The engine is the aircraft, the German manufacturers decreed. Probably the finest of its class in pre-war days the famous

Mercédès motor, by long and continuous experiment, was developed to twice its original motive power, while reducing by an appreciable fifty per cent. its former somewhat impracticable weight. This new engine, a 150-h.p. six-cylinder type, was fitted into the latest type of Aviatik machine. Immediately the results were forthcoming. In as many weeks German airmen conducted a startling attack on the French lines, three times penetrated into Allied territory and played havoc with the Allies' daily routine reconnaissance patrols.

A Policy of "Scrapping"

Perhaps first of all the belligerent nations to initiate the costly but invaluable practice of scrapping material, no type of German aeroplane that was out of date or proved unsatisfactory in its tests but was destroyed immediately and a new craft substituted in its place. The enemy aerial commanders were unusually severe in this respect. More types of machines were scrapped than types developed! However, in the German opinion it was only by such resolute methods could he hope to secure for a few months, the few months that might be all important, that slight but decisive superiority in the air on which so much depended. It was the old naval competition over again; ever more horse-power and more guns; only the out-dated types were dropped out of use, were forced out of use, more quickly and more completely than ever could be the case with the sea. The new machines, meanwhile, were influencing in no small degree the effectiveness of the German airmen on the Western front.

That these new enemy aeroplanes constituted a new menace was a fact not lightly to be denied. They were undoubtedly worthy of all the respect and admiration which the French, no mean flyers, accorded them. But it must be remembered that, in those comparatively early days of airmanship, it was possible to produce a machine too wonderful for any but the very best airmen. In the future power was to be more easily controlled; at present it made a very large demand on the skill of the pilot. It remained to be seen if the German airmen had made advances proportionate to those of the German designers.

For the first three months it would appear that they had not.

Then, on April 14th, their real aerial offensive commenced. This was in the Champagne and Woevre districts, and never since the war began had there been such an intensity in bomb-dropping. Additional to the new types of machines, the Germans were experimenting with heavier bombs. On the 14th a Taube attacked an Allied railhead where a hospital train was loading up. There was consequently a number of troops about, and though only one bomb was dropped, it was of a size never yet seen in the war, and much damage was done.

The German espionage service in Allied countries was very active in conjunction with the Zeppelin campaign. For instance, for over two hours and without apparent reason, a Zeppelin hovered over Bailleul on the night of April 16th. As no bombs were dropped, the French Intelligence people began to get curious. And, a fortnight later, by methods that were as vague as they were invaluable, established the fact that certain high officers had been expected to stay at Bailleul that night. At the last moment, however, the visit had had to be postponed. The source of information from which the enemy had received the news had not been able to warn him of the sudden alteration of plan in time.

All down the Western front now, at infrequent intervals, the new aeroplanes were being tried out by picked airmen prior to their general employment by the battle squadrons. The same month, in the neighbourhood of Hazebrouck, a German machine was noted of a distinctly novel pattern which apparently was out for trial purposes, as it made off at the first hint of an opponent, and showed in retirement a quite remarkable turn of speed. It did not reappear, but, in the weather conditions then prevailing—strong south-westerly gales and rain-clouds that allowed no range of vision—that was not remarkable. It may be remarked that every available new enemy machine was being concentrated at this period in the neighbourhood of Ostend. Conditions at that town were daily becoming more unbearable owing to the repeated raids made by the Allied aviators. The harbour station, after three air raids, was still standing, though much damaged. The reason for the repeated air attacks was that Ostend, as has already been mentioned, was used as a submarine base by the Germans, and the

station as barracks for marines. The Hotel La Couronne, where high officers frequently established themselves, was very soon obliged to close, as in the immediate neighbourhood many bombs had been dropped, which destroyed part of the bridge near the hotel. Some villas—used as German military offices—on the boulevard were also damaged. As an espionage counter-measure the population were forbidden to leave the town or enter the prohibited area near military places. The new defensive squadrons, however, were not able to grapple with the Allied bombers for over two months, and then only at the price of several new machines.

The Beginning of the German "Circuses"

Having fulfilled their purpose of stemming the Allied air rush over Belgium, the new German squadron had to be rushed down immediately (May) to the Ypres-Dixmude line, where a fresh concentration of our machines had commenced. At Staden, May 26th, these raiding British squadrons bombed the railway station sky-high, stopping the traffic with Roulers and delaying the shipment of ammunition for howitzers. A rest billet near Houlthust Forest, occupied by German infantry fresh from the trenches at Knipehoek, was bombed disastrously the following day. Every day the Allies' aerial scouts were thick above the enemy positions from dawn till dusk; their work proving of especial danger to the enemy, as defining the German artillery positions on the Yser. It was six weeks before the mobile squadrons—so soon to develop into the famous "circuses"—were able to restore anything like equality in the air. And then their immediate presence was demanded on the German home front.

So in this fluctuating war in the air within four months the area of activity of the mobile squadrons passed from northern Belgium to the battlefield of Ypres, and thence far down to the Vosges mountains in the south. The strain and wear on machines and pilots alike was already beginning to be badly felt. The Rhine front was a particularly difficult situation to tackle. Operating from Belfort an aerodrome and base of unusual proportions, innumerable squadrons of fast, new and powerful French machines were playing havoc with the German

towns along the Rhine. Two large Allied squadrons on May 17th attacked the railway positions along the Rhine, bombing to some purpose Mulheim and Habsheim stations, and setting fire to immense forage stores at Mannheim. The German inhabitants were more than justified, after the terrible bombardment they endured, in their subsequent attack of war nerves and their urgent appeal to the Imperial Government for protection. The Allied aviators reached Mannheim at dusk, and during a half-hour of tremendous activity succeeded in firing several vast depots containing fodder for 1,600 head of cattle. These were burnt down completely during the following night. The buildings destroyed were the agricultural exhibition halls of the Lanz Machine Works, which had been used for stabling 1,600 cattle, removed recently from Alsace, and where great quantities of fodder had also been stored. And by daybreak nothing was left of either building.

Almost every day at certain hours the German inhabitants had to accustom themselves to the sight of French and British aeroplanes over their towns; but never before had these birds of war come in such numbers. Hardly, for instance, had the guns and factory whistles announced their arrival at St. Ludwig and Huningen when others appeared at Neuenberg and Mulheim, and others, again, at Kandern, Wolbach, and Lorrach. They came as solitary flyers or in pairs, and sailed gracefully north, east or south in majestic curves, not minding in the least the noise of the barking batteries below or the bursting shrapnel in the air. In Bale, from whence most of these visitors could be seen and observed without the slightest risk, the inhabitants rushed to their windows to gaze, crowds gathered in the parks and squares, and travellers climbed to the roofs of hotels to have a better look. For the obvious reason of preventing a neutral opinion that Germany had been driven from the air over these localities, and to pacify local agitation, the mobile squadrons arrived at Mulheim in the last week in May.

The Germans play into our Hands

The German Main Headquarters commenced to feel genuinely alarmed at the new situation in the air. The Allies, as they well knew, must have been informed of the existence of the

Aeroplane Photos :] *[R.A.F. Official*

THE END OF AMBITION

These two pictures are typical of the end of thousands of German aeroplanes. The top photograph shows the tattered wreck of a Hun bomber on the Western front, whilst the lower is of a raiding plane brought down in the Channel after bombing a British coast town. Inset is the picture of Von Hoppener, Head of the German Air Service.

mobile squadrons, and done everything in their power to counteract this new development. To their intense disgust the enemy at last awoke to the fact that for some months now they had been playing into our hands. All the finest pilots and aeroplanes of the German Army had been concentrated in these mobile squadrons. The idea was very sound. The aeroplane, the most rapid vehicle of modern war, could be moved with ease in a few hours several hundreds of miles up and down a long front. Thus at any given moment they could be concentrated at any given point. Unfortunately for the Germans, however, this scheme could work both ways. Knowing where these squadrons would be operating, the Allies could make an appearance of renewed aerial activity on some part of the front far distant; and immediately this activity was reported be sure that the mobile squadrons would very soon be hovering in that locality. By so doing and with the restricted number of pilots and machines now at their command, they were able to make a far better show in the air than they had ever imagined, until at last the enemy was forced to abandon the idea of mobile squadrons. Because of this the appearance of the celebrated circuses was delayed for another nine months.

Meanwhile the enemy distributed the personnel and craft to various new bases along the Western front. Apparently this new move was to prove successful, for, by the end of July they had established a very definite superiority in the air from the sea right down to the Vosges.

If full reliance could be placed in the German official reports, the enemy had achieved a very real supremacy of the air by the end of 1915. It is a curious fact that when their main headquarters chose to be truthful—an average of seventy-five per cent.—the reports were trustworthy to the smallest detail; but when for some reason or other they wished to distort fact, the untrustworthiness of the reports achieved an equal degree. Summed up in their own estimate, the German battle-pilots and anti-aircraft gunners reaped an unusually rich harvest in the autumn months.

The air war still fluctuated to an enormous degree. Whereas a great increase in German aerial activity was evident over Alsace in the late summer, it was not until the end of September

(September 23rd—October 11th) that consecutive spells of aerial warfare continued for more than two or three days at a time. This was again the condition along the air front until well after the New Year. Though perhaps the week before and after November 29th might be excluded from this summary. On that date the Germans reported: "During the clear frosty weather there was lively activity on the part of artillery and aviators along the whole front. To the north of St. Mihiel an enemy aeroplane was forced to make a landing before our front, and was destroyed by our artillery fire."

In the eastern theatre of operations aerial warfare was equally spasmodic. However, better prepared than in the previous winter, the Germans were busily engaged in organising in Libau a big aeroplane base, and work was proceeding energetically on the construction of an enormous hangar where Zeppelin parts, brought from Germany, were put together. From this new station the enemy airmen rendered invaluable assistance to Hindenburg's forces, still struggling on in the marshes and morasses of the Russian lowlands. On September 11th Zeppelins heavily bombarded the railway centres of Vilijka, east of Vilna, and Lida. Near Friedrichstadt, a fortnight later, a German aviator shot down a Russian aeroplane; and two further Russians were shot down on September 30th. October 13th and 15th respectively Berlin reported: "During last night one of our airships bombarded the fortified town of Dvinsk, which is full of troops, with a good number of bombs," and "One of our airships freely bombarded the railway station at Minsk, where a considerable transportation of troops was going on. Five heavy explosions took place, and a great fire was observed."

And again on November 30th a German aeroplane squadron attacked the railway establishments of Jachowitschi (to the south-east of Baranowitschi).

In view of this somewhat extensive activity it is not surprising to find that the official returns of losses in the German air squadrons were in June 53 killed, wounded and missing, in July 43, in August 89, in September 79. Among these were numbered some of the best known of the enemy pre-war civilian pilots. Lieutenant Werner von Beaulieu, who carried off the

second prize at the 1914 Prince Henry Circuit Competition, was one of the first to meet his death. Two others, Otto Stiefvater and Lieutenant Pappe, September, 1915, were killed at Johannisthal while carrying out a test flight on a new machine. Lieutenant Otto Thielen had been brought down and captured by British airmen. Another well-known pre-war aviator, Lieutenant von Hiddessen, who was the first German pilot to bomb Paris, for which he was decorated with the Iron Cross, was in the hands of the French. And Werner Landmann had for some time been a Russian prisoner of war.

New Enemy Machines

Some very interesting details concerning the new types of German machines were revealed by Landmann to the Russian General Staff. Among other things, he declared that the new German scouting aeroplanes were very fast and yet most strongly built. They were designed to keep the air for hours on end and to cover immense distances. The recently introduced "invisible planes" were a great success, not so much because they were literally invisible, but because their curious composition rendered it impossible to judge with any accuracy their position in the air, and this made them peculiarly immune from attacks. A new type of defensive plane upon which great hopes were centred by the German High Command was far beyond anything so far produced by the Allies.

Although communicative enough in other respects, Landmann declined to mention any characteristics of the new machine beyond saying that it was kept in readiness to the rear of the German lines, and never ventured into hostile territory, since it was built for defence purposes only.

This great German aerial organisation, constructive and combative alike, was directed from a special department at headquarters. Of whom exactly this department was composed or where exactly German Headquarters was situated it is impossible to say. Dr. Max Osborne, writing in the *Vossiche Zeitung,* describes it simply as the Headquarters Staff in K. "Headquarters," Max Osborne declared, "has a perfectly quiet time. We had scarcely ventured out of the house when a loud explosion was heard. This was not the first occurrence of the

kind, for the enemy aviators had been flying over the district all the afternoon. But their work grew livelier now. And look! Right over the roof of the house of the divisional staff there is one of those threatening fellows. He is fairly high, but you can see well enough that he is a French airman. The machine is greeted with a lively fire. It seems to be surrounded with shrapnel. And the Frenchman does not like his reception. He darts this way and that, as if he were undecided what to do. But he continues to fly right over our heads. We rushed into the street, and the soldiers followed our example. The commander wrinkled his brow. 'Let everyone seek cover,' came the order. The soldiers dispersed, but the commander did not think of seeking shelter. He remained in the street. It was too fascinating a spectacle to miss. In the meantime the gunners plied their trade.

"At that moment a tall officer came round the corner and went up to the commander and clicked his heels together, saluted, and said: 'Your obedient servant, Excellence, two French airmen have been captured.'

"Everyone looked round. There they stood, two fine young men. Their faces were deathly white, and one could read the terror of death and the excitement of their present situation in their countenances. They stood in front of the general, staring into his face as if they would read their fate there.

"'Je suis blesse,' said the pilot, and pointed to his back. But the officer who had brought them up said that the wound was not dangerous—only a slight hurt that the Frenchmen had received as their machine came to the ground after the engine had been hit. 'Au jardin, s'il vous plait,' said the general politely, with a wave of the hand. Both were so astonished at this chivalrous greeting that they appeared at first to be rooted to the ground.

"And now they stood at our side and looked up at the firing which was directed at their comrades in the air, until the airmen up above made off and the two Frenchmen were taken farther afield."

The German aerial command by this time had successfully run foul of the whole world. Enemy aviators were incessantly violating the neutrality of the air over Dutch territory. Fre-

quently they were brought down and interned. Among the latter were two German deserters, who arrived at Aardenburg (December 17th) in an aeroplane. They were a lieutenant and a private. The aeroplane passed over the frontier at a height of thirty feet. Both men were sent to Flushing later to be interned. And after forwarding a strong protest to Berlin against the innumerable German aeroplanes hovering over Swiss territory, the Political Department of the Swiss Conference published the following communiqué on October 24th :

"The German Minister to-day informed the Political Department that a military inquiry has proved that the aeroplane which bombarded Chaux-de-Fonds was German, and that the pilot had completely lost his way, and believed that he was over French territory. The aviator and the observer have both been transferred and punished, and German air squadrons have once more been warned against flying over Swiss territory. Aviators have also received the strictest orders not to throw bombs except when they are without any possible doubt over enemy territory.

"The German Imperial note expresses to the Federal Council its deep regret for the incident and also to the injured persons, and further promises to pay an indemnity for the damage done and in recognition of the moral wrong. A Note in this sense has been handed to the Swiss Minister in Berlin."

In their customary clumsy, somewhat childish fashion, the German High Command forthwith attempted to justify their illegal acts by falsifying the daily communiqués. Firstly, they persisted deliberately with regard to Poperinghe, a defenceless, non-military city, in classifying it as an armed camp, as was the case, November 19th : "A German air squadron attacked the British Army encampment at Poperinghe." Already on September 22nd they had accused the Allies of flying machines with obvious German markings on the wings and fuselage in the attack on Stuttgart, and killing four persons and wounding a number of soldiers and civilians. Later a most amusing contretemps was the outcome of this accusation, as : "Owing to the fact that shortly before, at 7.45 A.M., the military authorities had been informed of the approach of a German pilot the population could not be warned in good time. This German aviator arrived over Stuttgart at 9.30, and was fired upon from

below for a short time until he was definitely recognised as a German. He landed unhurt near the town."

On two occasions in two months the British Admiralty had to issue denials of wild enemy reports. In the first instance, November 26th, in the "Wireless" news sent out from Berlin, there was the following:

Wild Enemy Reports

"According to the New York papers, a German aeroplane in the Dardanelles dropped bombs on an English light cruiser in September, thereby killing 145 officers and men and injuring a still greater number. The Allies have concealed the incident, but the report has been made known by the engineer Eric Wilson, who returned on the Adriatic." Immediately the Secretary of the Admiralty announced that there was no truth in the above statement. And on December 1st Wolff announced: "In his report of November 29th Sir John French states that a German submarine was destroyed by an English aviator near Middelkerke. Wolff's Bureau hears from an authoritative source, however, that this report is totally untrue."

Hand in hand with the great development of heavier-than-air craft, the extension of Zeppelin construction was proceeding apace. Unusual attention was paid to detail. Innumerable air bases were laid out along either frontier of Germany, which, with an eye to greater strategic value, were sufficiently near to the frontier to permit of the raiding airships penetrating deeply into hostile territory, while yet themselves being beyond range of the enemy heavy artillery. The Allied airmen in Belgium had taught the Germans an invaluable lesson with regard to shed construction. The wood which had blazed up so fiercely from the fires caused by the Allies' incendiary bombs was replaced with iron, not only for the framework, but also for the roofing. Krupp's were instructed to proceed with the construction of a large portable shed. Instead of concentrating these buildings in such well-known centres as Wilhelmshaven, Hamburg, and so on, sites were chosen at an extraordinarily large number of places in widely separated localities in Germany.

Simultaneously with the erection of sheds, airships were

being constructed. At a score or more places throughout the Empire the construction of Zeppelins was being carried out. In no department of constructional work in Germany at the time was there greater activity than in this one. Not only had the plant been greatly increased, but everywhere they were working with nothing less than feverish haste. And the enemy had good reason to devote more attention to the strengthening of his airship squadrons than anything else.

Zeppelin Losses

The repeated loss of craft still threatened to outrun the limits of construction. Fate was never lenient with Germany in her Zeppelin campaign. By sea, by shore, by shell, by fire, hardly a month now passed without the loss of one or another of these giant airships. The Z 18 was blown up in a new shed near Tondern, Schleswig, on November 17th, between 8 and 9 A.M. She was the largest and costliest ship of the whole fleet. Rounded at either end, instead of pointed as had been the case with previous types, with a comparatively broader envelope, to which the gondolas were built flush, she had been treated with a coating of special "invisible" paint that rendered her a most difficult target to anti-aircraft gunners while in mid-air. The explosion occurred while soldiers were pumping gas into the envelope, and was due to a marine engaged in making alterations to the roof of the shed dropping a burning cigar on to the airship. Z 18 had only arrived the previous day, and had made one trip westward over the isle of Sylt before it was destroyed. The shed had only just been completed, and a few alterations were being carried out, some platforms for anti-aircraft guns being taken from the roof and placed on the ground at the four corners of the shed. The explosion blew off the roof and killed or injured eleven men; the Zeppelin caught fire and was entirely destroyed, and all buildings in the vicinity were razed to the ground.

The Germans endeavoured to keep the loss a profound secret, and no passports from Tondern were issued for three days. The loss was denied emphatically by the whole German Press, but travellers arriving in Denmark from Germany confirmed the report, also that it was a new airship of the largest type.

Three weeks later (December 1st) the L 22 likewise was destroyed by the accidental explosion of a bomb as she was leaving her shed at Husum, Western Schleswig-Holstein. Forty of the crew were killed or wounded, and the huge shed partly demolished. The L 22 had only been a few weeks in use. She was a sister ship of the Z 18, and also of the super-Zeppelin type, with all the recent latest improvements, including platforms on the top of the envelope for the machine and anti-aircraft guns, invisible gondolas and detachable rafts for floating purposes in case of accidents in crossing the sea. Again on 17th December travellers from Brussels arriving at Roosendaal stated that a Zeppelin exploded on the previous Wednesday near Namur, all the crew being killed. The explosion was said to have been due to a motor defect. The Zeppelin was travelling towards Ypres, with a heavy consignment of bombs. Three peasants working in a field near where the Zeppelin fell were arrested and taken to Germany—for fear that they would reveal the disaster.

William II. in a Zeppelin

It is all the more surprising, then, to discover the extraordinary interest evinced by German royalty in their Zeppelin fleet. Frequently they made personal trips into the air. The Duke of Mecklenburg, November 10th, made a long flight in a Zeppelin airship for exhibition purposes from Temesvar to Sofia. On arrival at the latter town he was received by King Ferdinand of Bulgaria and a brilliant entourage, who witnessed the landing. The Kaiser himself, according to the *Bourse Gazette*, ventured one such flight, which nearly cost the Emperor William his life. It was officially denied in Germany that his Majesty was aboard the ill-fated craft, but the crew and officers were specially rewarded, according to the *Kriegszeitung*, for "saving the Emperor's life during a flight at the front." Sleeping, working, and reception rooms had been specially fitted for his Majesty. The observation cabin was fitted in the floor with a window constructed on the principal of binoculars magnifying seventeen times and measuring over a yard across. Among the other novelties were special parachutes to serve the purpose of lifebelts at sea in case of extremity.

The Great German Recovery

After several postponements this important flight was finally fixed for a day on which drizzling rain fell. The Zeppelin quickly rose above the clouds into brilliant autumn sunshine, and landed quite regularly at Warsaw, where it was met by an Austrian Archduke and a guard of honour. The Emperor emerged, watch in hand, bidding those present to note how precisely punctual was the airship's arrival. Half an hour later the trip was resumed, apparently towards the fighting front of the German armies.

It was now that things began to go wrong. The engines stopped, and mechanics hastened along the corridors and climbed outside ladders. The Emperor was told that an accident, common enough with Zeppelins, had happened, namely, that one of the screws had broken and was tearing into the aluminium painted envelope and causing a wastage of gas. This screw was to be changed while the ship was moving, and, after it had been repaired, the engines started again for home. Spare screws were always carried. Nevertheless, the repairs seemed to be inadequate, and the loss of buoyancy increased beyond normal limits. The airship began to list heavily, and a parachute was prepared for his Majesty's use. The commander of the airship telegraphed to the earth, and the whole countryside was quickly aroused, cavalry and motors flying in all directions in obedience to the notification to prepare for a descent at any moment and anywhere.

The engines were stopped, and everything having weight was flung overboard, even the officers' swords being jettisoned. But the huge machine continued to fall until, by a great stroke of luck, its anchor caught some trees, and the airship reached the ground without actual disaster. Apart from official recognition by orders and medals, every officer and man concerned received special rewards from the German Emperor personally, and the intercepted letters of pilots contained details of these awards.

There was now more time and opportunity for these ceremonial flights. The Zeppelins had long since been withdrawn from flying over the battle-lines, as being too great a risk for information of too small a military value. Except for scouting at sea and occasional sorties into Russia, they were reserved

entirely for the campaign against Britain. This was developed at every opportunity. A long series of favourable expeditions reached a climax, so far as 1915 is concerned, with the September 16 raid on the East Coast of England. "It is reported that early on the morning of the 16th," was the account issued by the German "Wireless" Bureau, "two German airships appeared over Maldon, Essex, and dropped four bombs without doing any material damage. Three explosions were heard, and a woodyard was set alight. They also threw bombs on Weybridge. Two miles farther on some houses were set on fire. The airships continued their flight over the course of the River Blackwater. In the early morning an airship coming from the sea flew over Lowestoft and dropped three or four bombs. Three explosions were heard. Six bombs were dropped on Southwold. The airship then made for the sea."

Some idea of the sensations experienced when sheltering from one of these daring raids has been given in Vol. I. of this history. From the other point of view it will be useful to include a brief summary of the account from the lips of one of the enemy aviators, participating in such a raid.

"Above the Bank of England I shouted through the speaking-tube, 'Fire slowly.' Mingling with the dim thuds and vivid flash of the guns below, came the explosions and bursts of flames from our bombs. . . . In the vicinity of Holborn Station we dropped several bombs. From the Bank to the Tower was a short distance; I tried to hit the bridge. Manœuvring and arriving directly over Liverpool Street Station, I shouted, 'Rapid Fire,' through the tube, and bombs rained down. . . . I want to say there's not an officer or man in the German aerial fleet who didn't feel it deeply when he learnt that women and children and other non-combatants had been killed."

A Zeppelin Commander's Story

The words are those of the great Commander Mathy, the doyen of the once invincible German Zeppelin fleet. It is the still, quiet hour before the dawn of September 9, 1915. The sun has barely climbed the eastern horizon when one after another the lithe, grey wolves of the air—four giant Zeppelins

in a long, graceful line—sweep furtively down on to the Evere (Brussels) landing-ground. Dishevelled and dusty, with tired eyes lined significantly by the terrible strain of the past eight hours, the Commander, nevertheless, is boisterously happy as a schoolboy. Outside, on the level patch of grey aerodrome, is one great vessel that has been winged by gunfire; painfully visible is the ragged, gaping tear in the grey fabric mass overhead. A score of perspiring mechanics hover busily about the rear gondola of another. Lolling helplessly to port, the framework of a third has been badly damaged when landing. Great, blunt-nosed elbows of the aluminium ribs protrude nakedly through the slender fabric, suggestive unpleasantly of human flesh and bones. But what are these minor casualties to the German airship commander who has just bombed "the dark spots of London"; who, in the bombing, has massacred twenty, maimed eighty-six helpless women and children?

Mathy, in his own words, unconsciously gives voice to the psychological paradox of the whole German Empire at war. Providence, not the much-maligned German main Headquarters, chose to leave those non-combatants in the path of the falling bombs. Providence had cast in its lot with the German arms; therefore Germany could not do wrong. However, circumstances sometimes were against her. So the most curious self-hypnotism of history is explained. So thinks Commander Mathy, crack aviator, pilot leader of Germany's latest, largest, and most powerful airship. He is worthily typical of his race, is this short and portly middle-aged man with his close-cropped fair hair, that lends a revolting baldness, an almost babyish pinkness, to his square, bullet head. He had learnt that gruesome lesson of "Germania über Alles" in a hard school. From the command of a destroyer of the enemy High Seas Fleet—where the tradition was amply nourished—he passed, at his own request, to the Zeppelin service. Commander Mathy was certainly born to be hanged. Once he was the sole survivor from a disastrous wreck off the coast of Denmark. A shell bursting only a dozen yards away from him on the occasion of an informal visit to the Western Front killed his companions on either side but left him without a scratch. The day previous to its destruction he was on a Zeppelin which was burnt and

destroyed in the air over Johannisthal, in 1913. He was on a navy Zeppelin two months later, the day before the craft was wrecked in a storm on the North Sea, and in some way missed the voyage on the fatal day. It is of his hundredth flight in charge of a Zeppelin which he tells; his tenth war-raid on England.

This attack on London was both sharp and short; just ten minutes—10.50—11 p.m. on the night of September 9, 1915—to justify the long and perilous voyage out and home across the North Sea. "For the first time," said Mathy, "my instructions were to attack certain points to the south of the City of London, such as railway stations, bridges, industrial establishments; strict orders to do everything possible to avoid hitting St. Paul's and other churches, museums, Palace, Westminster Abbey, Parliament, and, of course, residential districts." In late sunset they were far out over the grey wastes of the sea; moving through the air at a lively speed, with a favouring wind to help them along. Behind lay the fast receding shores of Germany; below the white-capped billows of the North Sea, like a watery desert in motion, stretching on all hands to the darkening horizon, without a sign of life except a single fishing craft. Tense and eerily alone, concentrated on the grim mission before them, they were conscious only of a sensation of unusual speed and numbing cold. They ate and drank—being Germans—en route; every man's pocket was his pantry; each of them carried a snack. The officers regaled themselves with sandwiches and occasional pulls at their Thermos flasks—of hot coffee or tea. "Zeppelins are teetotallers." There is no drink nor smoke; not even a doctor is carried. If a man is wounded under way he must take his chance—a poor one at that. The wound is bound up as well as possible; the sufferer given a drink of cognac, and waits until they get back. And they sang, more to keep the minds of the crew from brooding on the awesome dangers which lay ahead; deep-voiced, guttural songs of the Fatherland; quaint snatches of vociferous patriotism. Until, breaking through the grey mists of the distant shore, the low-lying Essex coast came visible; later, the shallow, mud-locked mouth of a river, with a tiny island off-shore. The rendezvous!

"Below us it was rapidly getting dark, but was still light

up where we were. On one side or the other was a Zeppelin, in grey war paint, like that of my craft, visible in the waning light against the clear sky, gliding majestically through the air. A low, mist-like fog hung over the line where England lay. Stars came out and it grew colder." Suddenly a sharp order rang out, "Klar zum Werfen" (Clear for Action). Up went the nose of the ship, climbing into the clouds, so that the noise of the engines should not disclose to the English shore-batteries their rapid approach. The crews hurried to their stations at the guns. On the bridge the "gunnery lieutenant" tried and sighted the deadly bomb-dropping apparatus. Mathy, one anxious eye on the dully-red glow of London, already reflected against the sky-line—"I saw the reflected glow in the sky thirty-seven miles away shortly before ten o'clock"—hand ready and poised at the steering-wheel for the first warning burst of flame from the unseen batteries of bristling guns far below, swung his ponderous craft gently and gracefully over the coast and headed directly up the Thames. The raid had begun.

Over London

The veil at last is torn aside from that haunting, mysterious picture of the autumn nights of war. Down below in the sinister darkness and up here amid the blood-red fury of the raging guns are worlds as far apart as the two eternities. Below, London imagines in its chilly cellars that the earth's surface is as dark as the inky heavens overhead. "The English can never darken London." Above, those daring raiders have all their eyes and attentions focused on the broad, gleaming, snake-like course of the river that glides on and on, pointing inevitably to London. Said the enemy Commander: "It is an indestructible guide-post, and a sure road to the great city." The latter knows itself black and lifeless as the grave, yet: "I headed for the glow of London in the sky, and then a point on the Thames, to get my bearings for my objective attacks." It is a matter of luck where fall those murderous bombs! Yet, with cunning afterthought, in the outline of the city, still and silent, below in the distance, the ruthless invaders make deliberately for the dark spots which stand out so obviously from the blur of lights in the well-lit portions.

As if in the twinkling of an eye all this changes. There is a sudden flash, and a narrow band of brilliant light reaches out from below, and begins to feel around the sky, a second, a third, a fourth, a fifth, until soon there are more than a score of criss-crossing ribbons. "As viewed from a Zeppelin, it looks as if the city had suddenly come to life, waving its arms around the sky, and sending out feelers for the danger which threatens. "Immediately the attack begins. A single command echoes sharply along the throbbing spaces of the giant airship: "Abwerfen" (Throw down). But at the same moment they are held by the dazzling beam of a searchlight. The first bomb falls and others follow at short intervals. In spite of the hum of the propellers and the noise of the motors, they can hear the bombs exploding, with a dull thud and a blinding flash of flame, far below. There are little red flashes and short bursts of fire which stand out prominently against the black background. From north, from south, from right, from left they appear, and following the flashes rolls up from below the sound of guns. "It is a beautiful, impressive, but fleeting picture as seen from above, the greyish, dim outlines of the Zeppelins gliding through the waving ribbons of light and shrapnel cloudlets which hang thick."

"Feeling for Life"

By now the raiding airships are fighting for dear life against all the concentrated fury of the London air-craft defences. "Our eyes and minds are concentrated in our work, for any moment we may be plunged below, a shapeless mass of wreckage and human bodies shattered beyond recognition." Dark, looming, indistinct masses, St. Paul's, the Bank, Holborn, the Viaduct, Liverpool Street Station, with its great illuminated expanse of glass roof, all flash past in this eerie kaleidoscope of the tortured night. Bombs, more bombs, dull thuds, sinister and menacing, secondary masses of roaring flame, the warning, shuddering thud of a too-near shrapnel shell-burst; one moment those airships' crews are enduring exquisite agony and terrors unimaginable; the next—the square miles of London are but as square yards to the lightened speed of a fleeing airship—they are sweeping out majestically across the countryside.

At 12.15 they have crossed the coast-line, and at 12.30 this message is sparked: "Place, North Hinder Lightship, London attacked"; nothing more, as all details are reported in writing after arrival. Then, perhaps, merely a reactionary effect of this "glorious exploit"; perhaps, when faced with that grim toll of maimed and massacred, the prickings of conscience that refuse to be stifled, Commander Mathy: "Balfour said London was not a fortified city, and that its defences against aerial attacks were poor. We know, however, there are several forts and batteries around the City and outside, and had he stood by my side and looked into those flashing guns, all over, he wouldn't say London was not a militarily defended city, and perhaps not think so poorly of its aerial defence."

CHAPTER IV

THE NAVY THAT FLEW

From Scapa Flow to Mafia—A Great Battle in the Air—Destruction of the *Königsberg* by Naval Aircraft—The R.N.A.S. on the Belgian Coast—Seventeen Months of the War in the Air by Sea.

BRITISH naval airmen had no call to complain of the monotony of their work. Busily engaged in locating the *Konigsberg*, at a wild, deserted spot on the African coast, almost on the Equator; patrolling under clear, blue skies and over sparkling blue waters of the Mediterranean; lending a hand with the guns at the Dardanelles landing; penetrating far down the arid wastes of the Sinai Peninsula; sweeping the Channel for the sinister periscopes of German submarines; when needs be escorting an odd troopship or so across to France; by night and by day driving off the enemy raids on England; and scouting far out over the grey wastes of the North Sea with the Grand Fleet; theirs was the pick of the fighting. It was a clean, decent business.

All the time it was man to man; every time the best man won. Occasionally some snorting destroyer, or lithe, grey submarine would dash up in support of a fallen aircraft; but rarely. There was no mercy in the air war by sea, and no prisoners. That was the beauty of it—that and the variety. The latter was as novel as always it was interesting. The campaign in the Tropics, for instance, was well under way by the New Year. Two naval fliers, in recognition of their "services," had been appointed Companions of the Distinguished Service Order. This incident occurred at Mafia.

Flight-Commander Cull and Flight Sub-Lieutenant Arnold were spotting under fire, in a biplane, when the enemy's fire damaged it so that it descended in a quarter of an hour from 3,200 to 2,000 feet. During this time no attempt was made to

return to Headquarters, although it was obvious that this could not be done unless a start was made at once.

Flight Sub-Lieutenant Arnold continued to send his spotting signals the whole time, and when a quarter of an hour later the machine was again hit and forced to descend, Flight-Commander Cull controlled the machine, and Flight Sub-Lieutenant Arnold continued to send spotting corrections to the last, after warning the monitors that they were coming down and would endeavour to land near them.

The aeroplane finally came down in the river, turning over and over. Flight-Commander Cull was nearly drowned, but was assisted by Flight Sub-Lieutenant Arnold, and both were rescued by a boat from the *Mersey*.

The *Königsberg* had so effectively concealed herself not only amongst the palms, but by actually covering the ship with foliage, that it was impossible to locate her exact position. The assistance of the Royal Naval Air Service had to be called in, and the position of the hidden cruiser was conveyed to the British ships by means of smoke bombs, so that very quickly the big guns of our ships got the range and commenced to batter the enemy unmercifully.

The main interest of the work of the R.N.A.S. transfers itself at this period, for several months, from Africa to the Belgian coast. Six aeroplanes of the Naval Wing, under Commander Longmore, set out from Dunkirk on the afternoon of March 12, 1915, for an aerial attack on Ostend and the coast. Two of these were forced to return owing to the petrol freezing in their tanks. The remainder, however, reached Ostend and dropped eleven bombs on the submarine repair base and four bombs on the Kursaal, the headquarters of the military. This attack, which was carried out with a favourable N.N.W. wind, was afterwards confirmed by the following extract from *De Tyd*:

"The general opinion of the public is, that the raid of the British airmen was intended rather to obtain a moral effect than to cause material damage. I was of the same opinion until what I saw with my own eyes, and what I learn from very reliable sources, made me change my mind. Besides the thirteen soldiers killed, and the thirty-five wounded in the Blanken-

berghe tram, and the submarine badly damaged at Zeebrugge, several batteries along the coast have greatly suffered, and a large number of guns have been totally destroyed. At Knocke one officer and seven men were killed, as well as many artillerymen. The bombs did not kill any civilian, nor touch any house."

A Plucky Pilot

These raids on the part of the British naval airmen took place almost every day and every night. And though official details are more often than not lacking, the matter is frequently amplified by personal descriptions, as the following from the letter of a certain Flight Sub-Lieutenant, who was captured by the Germans. "The German officer's first shot," he says, describing the preceding fight in mid-air, "unluckily for us, hit our petrol tank, and flames burst out behind. Darley, the pilot, shoved her nose down, and the German aviator followed us down, keeping behind and pouring lead into us the whole time. Fortunately, the tank did not explode—I cannot understand why—but went out. Darley had one bullet through his arm, one took the tip of his finger off, another smashed his thumb to smithereens. I amputated it with my penknife. I was untouched, except my clothing. I could not set our machine on fire as well, as the petrol had come out, and my efforts on the wing only ended in the waste of a box of matches. Darley did a stunt landing with only his left hand—extraordinarily plucky, I call it—and saved my life."

Plucky is a term which might well be subscribed to most of the flights over this enemy gun-ridden and plane-haunted locality at this time. It was a naval observer (April 30), who first located the position of the German gun which was daily shelling Dunkirk. According to his report it was a land gun that was doing all the damage, and not, as was popularly supposed, German warships hovering off the port. By 1 a.m. the following morning its position had been verified by aircraft reconnaissance. It was attacked in the evening, twelve small and two large bombs being dropped. At the same time a reconnaissance was made to Ostend, which proved clear of all important craft. A Taube appeared in sight, but kept

10,000 feet up and three miles off. British naval aeroplanes at once rose in chase, at which it retired immediately. Across the sea, naval aircraft at Harwich, one April Saturday forenoon, frustrated the attack of an enemy raiding squadron. Immediately the German aircraft loomed into view across the horizon, they started up in pursuit and drove them off. The enemy airmen dropped their bombs into the sea and made their escape, still flying at a great height. Thus again the lie direct was given to a German official communiqué which stated that, "German aircraft had dropped bombs on the Landguard Fort at Harwich."

By July 4 the position of the *Königsberg* had been definitely established by naval aircraft, and as soon as the monitors were ready the operations were begun. As the *Königsberg* was surrounded by jungle the aeroplanes experienced very great difficulty in spotting the fall of the shot. She was hit five times early in the action; but after the monitors had fired for six hours the aeroplanes reported that the *Königsberg's* masts were still standing. While, in order to complete her destruction, the Commander-in-Chief ordered a further attack on July 11.

This aircraft action was fully described in Vice-Admiral King-Hall's dispatch of July 15, as follows:

"At 5.25 a.m. an aeroplane, with Flight-Commander Watkins as pilot, and carrying six bombs, left the aerodrome on Mafia Island. The bombs were dropped on the *Königsberg* with the intention of hampering any interference she might attempt with the monitors while they were getting into position.

"At 5.40 a.m. another aeroplane, with Flight-Commander Cull as pilot, and Flight Sub-Lieutenant Arnold as observer, left the aerodrome for the purpose of spotting for the monitors.

"After anchoring, the *Weymouth* did what was possible to assist the monitors by bombarding at long range a position at Pemba, where a spotting and observation station was supposed to be, and by keeping down the enemy's fire at the aeroplanes. This was done very effectively.

". . . Fire was opened, as before stated, at 6.30 a.m., but as the *Königsberg* was out of sight it was very difficult to obtain satisfactory results, and the difficulties of the observers in the aeroplanes in marking the fall of the shots which fell

amongst the trees were very great, and made systematic shooting most difficult.

"There being only two aeroplanes available, considerable intervals elapsed between the departure of one and the arrival of its relief from the aerodrome thirty miles distant, and this resulted in a loss of shooting efficiency.

"At 12.35 one of the aeroplanes broke down, and at 1.30 the second one also. . . .

"As it was necessary to make a fresh attack on the *Königsberg* to complete her destruction, further operations were carried out on July 11, by which date the aeroplanes were again ready for service, and the monitors had made good certain defects and completed with coal. . . .

"The observers in the aeroplanes, by their excellent spotting, soon got the guns on the target, and hit after hit was rapidly signalled. At 12.50 it was reported that the *Königsberg* was on fire. . . ."

The Summer Naval Air Campaign (1915)

The summer aerial campaign along the Belgian coast was signallised by a particularly gallant deed on the part of Squadron-Commander Bigsworth, R.N. The Commander had already distinguished himself (May 17th) by dropping bombs on a Zeppelin which had raided Ramsgate early that morning, and the daring and brilliance of this second feat, perhaps, may be judged better from the fact that the British Admiralty, in the official account of the encounter, admitted, "It is not the practice to publish statements regarding the loss of German submarines, important though they have been. . . In this case, however, the brilliant feat of Squadron-Commander Bigsworth was performed in the immediate neighbourhood of the coast in the occupation of the enemy." The submarine was observed to be completely wrecked and sank off Ostend, and afterwards its position was located by a German destroyer. The Squadron-Commander received a D.S.O. for his "services." Whilst manœuvring into position he had sighted the submarine from a considerable distance and a high altitude. Though flying single-handed, and all the time under a heavy fire from the shore batteries, with great gallantry and coolness he swept down

to within 500 feet of the enemy craft, which was by now making desperate efforts to submerge, and after several attempts was able to get a good line for dropping the bombs with full effect.

Thus at last was realised the century-old dream of fiction writers. Though in virility of action and tenseness of purpose their mental apparition was cynically swamped by this grim reality. They had dreamed of the men, who, like soaring eagles, were to swoop daringly over the face of the astonished world, of ships that were to go down into the waters, and like whales, belly their way as and when and where they wished. They had never dreamed of the bloody carnage which would be fought out over, on, and under these once so peaceful waters of the North Sea—almost within gunshot of the white cliffs of Old England—when England herself would be fighting for dear life. In their wildest flight of imagination never could they equal the terror and romance, the adventure and the superhuman courage of these youthful soldiers of the Empire of the Air. And so the story continues on and on, for five bloody, but glorious years.

The naval aircraft now made daily trips, dropping bombs on the German defences in Belgium. On September 22, 23, again on the 24th, and again on the 27th, Bruges and Zeebrugge were raided. At about 9.30 p.m. of the 23rd an R.N.A.S. pilot appeared over Bruges and dropped bombs. His objective was the harbour, where some submarines were lying, ammunition was manufactured, and other military works carried on. One factory was completely destroyed. The following day more bombs were dropped on German troop concentrations outside Bruges. In the middle of the night (September 27) five naval aviators left Dunkirk and reached Zeebrugge at 6 o'clock in the morning, dropping a number of bombs on points of military importance. German anti-aircraft guns shelled them heavily. One of the machines (Flight Sub-Lieutenant Boyd) had just dropped the last bomb when, at an altitude of 14,000 feet, it was hit by shrapnel in the engine. The writer remembers how Boyd had laughingly remarked before setting out from Dunkirk that, "As he had been shelled badly at 8,000 feet the previous day, he would go up to the 'ceiling,' so that the blighters would have to leave him alone." Un-

fortunately his precaution proved useless. His companions, who flew at an altitude of between seven and eight thousand feet, all pulled through. Only he, at 14,000 feet, was hit. The machine began to fall, but Boyd succeeded in keeping himself for some time in the air and then made for Dutch territory, which he reached in a volplane and landed on Zeeland. His machine was hit in five places, and Boyd himself was interned. However, the general damage achieved was pretty considerable. Of the raid, the *Telegraaf* later reported: "In the village of Sluis, which obtains its gas supply from Zeebrugge, the gasometer was suddenly emptied and the gas supply cut off. It is believed that the gasworks at Zeebrugge have been severely damaged."

Seaplane v. Submarine

Flight-Lieutenant Ferrand was the next aerial airman to distinguish himself. On November 21, with air-mechanic Oldfield, in a seaplane, he shot down a German Albatross seaplane off Ostend. The Albatross dived nose first into the sea, and sank. During the course of the same day Flight Sub-Lieutenant Viney, accompanied by a French officer, Lieutenant le Comte de Saincay, whilst patrolling off the Belgian coast, dropped a bomb on a German submarine. The submarine was observed to have been broken in her back, and sank within a few minutes. "It happened on Sunday about noon," said Viney. "We had left at 11.30 in a French biplane on the look-out for submarines. We went up to about 3,000 yards, and west of Nieuport, about five miles from the coast, we sighted two submarines side by side on the surface. The position was very favourable for an attack, owing to the shallow waters. We circled down as fast as possible. The submarines were in an awkward position, as they could not dive, being probably over a sandbank. However, one of them zigzagged and managed to make away. The other was apparently more difficult to handle, as she never managed to get outside the circles we were making round her.

"When 200 yards from the sea level we dropped the first bomb, and plainly could see the damage on the submarine's bridge. We continued circling round, and dropped a second

bomb with a sure aim. The submarine's back was broken and she sank.

"We rose again, as by this time enemy aeroplanes might be expected on the sea; but before leaving we ascertained without a doubt that the submarine had been destroyed, as there was a large splash of oil on the surface of the sea."

And Flight Sub-Lieutenant Graham, in an aeroplane with Flight Sub-Lieutenant Ince, as observer, whilst on patrol on the Belgian coast at about 3.15 on the afternoon of December 14, sighted a large German seaplane and gave chase. After a severe engagement the German machine was hit and fell. Before reaching the water it burst into flames and at the moment of striking exploded. No trace of the pilot, passenger, or machine could be found.

Flight Sub-Lieutenant Graham's machine was severely damaged by machine-gun fire and fell into the sea, but both officers were picked up and safely landed.

Again, with regard to co-operation of naval aircraft in the sinking of the *Königsberg,* Vice-Admiral King-Hall, Commander-in-Chief, Cape of Good Hope Station, published in his dispatch of July 15, the following:

"I have much pleasure in bringing to the notice of their Lordships the names of the following officers and men:

"Squadron-Commander Robert Gordon, in command of the Air Squadron; Flight-Commander Cull; Flight-Lieutenant Blackburn; Flight Sub-Lieutenant Arnold; Flight-Lieutenant Watkins.

"Assistant Paymaster Badger. This officer volunteered to observe during the first attack on the *Königsberg,* although he had no previous experience in flying.

"Air-Mechanic Boggis, who went up on April 25 with Flight-Commander Cull, and photographed the *Königsberg* at a height of 700 feet. They were heavily fired on, and the engine of the machine was badly damaged.

"Acting Lieutenant Bishop, Royal Marine Light Infantry. This officer volunteered to observe during the second attack on the *Königsberg,* though he had had no previous experience of flying.

"Most serious risks have been run by the officers and men

who have flown in this climate, where the effect of the atmosphere and the extreme heat of the sun are quite unknown to those whose flying experience is limited to moderate climates. 'Bumps" of 250 feet have been experienced several times, and the temperature varies from extreme cold when flying at a height to a great heat, with burning, tropical sun, when on land. In the operations against the *Königsberg* on July 6, both personnel and material of the Royal Naval Air Service were worked to the extreme limit of human endurance. The total distance covered by the two available aeroplanes on that date was no less than 950 miles, and the time in the air, working watch and watch, was thirteen hours."

The World-wide Efforts of the R.N.A.S.

This, after all, represents but a small proportion of the work carried out by the naval aviators in 1915 in their various fields of operation. Summed up—it should be borne in mind that there was also a vast amount of work of which, for obvious reasons, it was at this time impossible to divulge particulars—it may be said that seaplanes since the war began had maintained continuous patrol of the Grand Fleet, and both seaplanes and aeroplanes had secured most valuable results by "spotting" objectives for ships' guns. Seaplanes, from seaplane carriers, had enabled H.M.'s ships to smash up the *Königsberg,* and similar "spotting" had been carried out in the Dardanelles. The Cuxhaven raid had been successfully carried out by seaplanes from a British flotilla. Projectiles dropped from seaplanes had sunk several Turkish ships in the Sea of Marmora. In anti-Zeppelin operations coastal patrols had given warnings of approaching raiders, and on various occasions succeeded in driving off the raiders. The Royal Naval Air Service detachment at Dunkirk had destroyed at least six German airship sheds, two of these having airships inside; damaged one Zeppelin and destroyed another in the air; destroyed another Zeppelin on the water which had previously been damaged by anti-aircraft guns; damaged submarines in the Cockerill Yard, at Antwerp; and continuously worried submarines in Zeebrugge and Ghent harbours. A submarine had also been sunk by naval aircraft off Ostend. The kite-balloons

of the Royal Naval Air Service, operating from ships, had also contributed to render naval gunnery effective in Gallipoli; and in Flanders been co-operating with artillery with excellent results. While it must be remembered that the only blow which had been struck up to the present by British forces on German territory in Europe had been struck by the Royal Naval Air Service at Dusseldorf, Cologne, Friedrichshaven, and Cuxhaven.

CHAPTER V

ST. QUENTIN TO THE VOSGES

French Aerial Spring Campaign—Hill 60—The Lost Taint of Individualism—The Raid on Ludwigshaven—Friedrichshaven and Hervilly——Adventures by the Way—Concentration for the Supreme Effort—The Air Duel of Bertin and Boyer—Unexpected German Courtesy—And Certain Enemy Illegalities—Commencement of the French Intensive Bombing Campaign—Aerial Strategy and Tactics—Summary of the Summer Campaign—Aerial Attacks on German Strategic Rail-Heads—List of More Important French Air-Raids on the Enemy Positions.

"Our Ally's (the French) aircraft have been particularly active. They have carried out numerous effective raids on a large scale, penetrating far into hostile territory," "I desire to bring to your Lordship's notice the assistance given by the French military authorities, and in particular by General Hirschauer, Director of the French Aviation Service, and his assistants, Colonel Bottieaux and Colonel Stammler, in the supply of aeronautical material, without which the efficiency of the Royal Flying Corps would have been seriously impaired." Two such tributes as these, the first is that of Lord Kitchener in his review of the progress of the war in the House of Lords on September 15th, 1915, and an extract from Sir John French's dispatch of July 6th, give the reader a very fair idea of the extreme value of French aviational operations in 1915.

The French opened the year in particularly brilliant fashion. In the period from February 16th to 25th, aeroplanes and airships took part in innumerable actions, and once more proved the remarkable efficiency of their employment for military purposes. As an instance of these aerial methods and results it is sufficient to mention the location on February 17th by a single aviator of twenty-one German batteries, and the discovery on February 18th of a heavy battery, which was immediately followed by an effective fire, exploding ammunition wagons.

While of the general air raiding campaign, the following brief summary will give some idea of the success of the French bombers in their operations:

February 25th.—Sixty bombs dropped on enemy railway stations, trains, and concentrations. Metz, three bombs on the barracks.

March 12th.—Rottweil, powder magazine blown up.

March 17th.—Bazancourt, station bombed. Altkirch and Cernay stations and Mulheim barracks. Bombs dropped on the stations of Anizy, Chauny, Tergnier, and Couchy le Chateau.

March 18th.—Pont Faverges aerodrome and ammunition store bombarded day and night with 90 mill. bombs. Freiburg station effectively bombed.

March 22nd.—Villers-Cotterets, three bombs dropped.

In one of these instances a French aviator, Captain Happe, bombarded the German powder magazine (March 12th) at Rottweil (fourteen miles north of Donaueschingen). His success was complete. Ten minutes after dropping the bombs the powder magazine was on fire, the flames rising to a height of 400 metres. The whole distance covered by this aviator was about 186 miles. The powder works at Rottweil were one of the most important establishments of the kind in Germany. Rottweil is situated on the Neckar, on the other side of the Black Forest, at a distance of ninety-three miles from Belfort as the crow flies. Another of the French airmen descended as low as 5,000 feet over the works in order to drop his bombs with greater accuracy. He succeeded in dropping four melinite shells, the first on the acid tanks and the other three on the works themselves. The bomb dropped on the tanks caused blue smoke to shoot up, which the airman at first took for the smoke of a gun fired on himself. Soon after a huge flame rose from the same spot, with columns of thick smoke, which reached as high as the plane. The pilot hovered for ten minutes above the works in order to observe the effects of his projectiles. He was thus able to note that besides the principal outbreak, flames were shooting up from different points, the conflagrations being caused by the explosion of the other bombs.

Two French aeroplanes (March 28th) appeared simultane-

ously over Metz and dropped bombs, which killed three soldiers. Two others flew at the same time over Strassburg, and took a malicious pleasure in circling, unharmed, over the towers of the old cathedral, but without dropping any explosives. Two or three other aviators were next seen over Freiburg, Schlettstadt, Mulhausen, and Colmar. The appearance of the French aviators over the great stronghold of Metz caused a commotion in the town. The civilian population was warned and terrified by loud signals from the military, trumpet-calls at all the principal street corners, the beating of drums, and the firing of guns. The orders of the Governor were that when these signals were given, including the blowing of the whistles in the factories, civilians should take refuge in their cellars. The streets were to be instantly cleared, and the shops and beer-houses closed. In a few minutes the whole town looked deserted, and the only persons still in the streets were soldiers returning to their barracks. Three of these were killed by a bomb which one of the aviators dropped from a great height. In Strassburg a similar scene was enacted. The factories blew their signals, and trumpets warned the inhabitants that they must go to their cellars or at least clear out of the streets.

In no engagement since the war began did French airmen render better service to the Army in the field than in the fight for Hill 60. To their skill and daring, indeed, it was due, together with the complete mastery of the air which they won and maintained, that the preparations for the attack were concealed from the eyes of the enemy. Every German aeroplane which ventured over the Allies' lines was instantly chased away or captured, and in this way five enemy machines were brought down. This period of splendid activity was signalised by an unusually fine performance on the part of Lieutenant Garros.

However, better to understand the aerial position at Hill 60, it will first be necessary to recount several of the more important aerial events in the preceeding seven days. On March 26th six French aviators bombarded the airship sheds of Frescaty and the station of Metz. They dropped a dozen bombs which caused a panic. Although exposed to a violent cannonade they all returned in safety. The French also bombarded the barracks

to the east of Strassburg. More and more desperate waxed the aerial bombing and combat before the armies on the surface came to grips. On April 1st, during the night, twenty-four bombs were dropped on stations and enemy bivouacs in the Woevre, in Champagne, in the Soissons district, and in Belgium—remote but vitally effecting the enemy's lines of communication. A bombarding flying squadron dropped thirty-three bombs on the huts and aviation sheds and the station at Vignuelles (Woevre). Most of the bombs fell squarely on the objectives, though the French aeroplanes were very violently cannonaded at close range. Three of them returned with large rents in their wings. The others had their fabric pierced by shrapnel bullets. Fortunately none of the aviators was hit. And all the machines returned without accident.

Three to One

Of the aerial combat it may be remarked that invariably the Frenchmen were fighting against greater numbers. Usually these were in the proportion of one French aviator to three or four Germans, but if it was necessary the enemy airman could be assailed in overwhelming force, for the French had always a large squadron of aeroplanes at hand in readiness for any emergency. Only once during the battle did a German airman, perhaps more daring than the rest, elude the Allied aeroplanes and fly over the lines. He was quickly chased away, but in his hurried passage he dropped several bombs on a position where shells from the German big guns were bursting. These battles in mid-air, the manœuvring of the opponent planes, the flash of their guns, and the little puffs of shrapnel smoke studding the clear blue sky formed a picture of extraordinary interest and fascination. But if the picture was fascinating, even more so was the action that lent it colour. Perhaps the most interesting of all these terrific duels of the skies was one on the evening of April 1st, to the south of Dixmude, where Aviator-Lieutenant Garros brought down an Aviatik. Armed only with a rifle, he did not hesitate to attack the enemy, who carried a quick-firing gun. There was a rapid exchange of shots, but the advantage of speed was with Garros. He was able to outmanœuvre his opponent, and, finally approaching within a few yards of the

hostile machine, shot the pilot dead. The machine was of the dual-control type, and the observer was able to bring it to earth. But he came down within the French lines, and both machine and observer were captured. This was the last service which the great French airman was able to render his country, for, while flying over the enemy's lines the following day a faulty engine obliged him to descend near Courtrai, and he was taken prisoner by the Germans.

The intensive series of French bombing raids continued, and though this continued similarity of action must prove wearisome to any reader of the history of the war in the air, it must take first place as being the most important action of the period. The French had now rid themselves of all taint of individualism; they were settling down to one of the grimmest chapters of their history, a military period when every bomb dropped counted for much and every loss of a pilot's life was a most serious loss. Thus on the afternoon of April 16th ten bombs were dropped on the railway workshops at the station of Leopoldshoehe, east of Huningue. These workshops were at this time being used for the manufacture of shells. Ten bombs were dropped on the powder factory at Rottweil. Six struck the mark. A huge red flame shot up, surmounted by dense smoke. The aeroplanes were struck by shell splinters but returned safe and sound.

Forty bombs, most of which hit the mark, were dropped on the central electric station of Mezieres-les-Metz, fifteen kilometres north of Metz. This station supplied the town and forts of Metz with power and light. Thick smoke rose from the central building. On their return the French aviators encountered three Aviatiks, to which they gave chase, forcing them to land. The squadron suffered no mishap though subjected to a violent cannonade from the Metz forts.

Another of the French air squadrons, composed of eighteen aeroplanes, each carrying heavy bombs, bombarded on the morning of April 27th the Ludwigshafen chemical factory belonging to the Badische Anilin und Soda Fabrik, by now one of the most important factories of explosives in Germany. The results proved the efficacy of the bombardment. Several buildings were struck and fires broke out in many places. The air-

men were nearly six hours in the air, and covered a distance of over 248 miles. This expedition against an important military establishment was a retaliation for the German air raid on Paris. The air raid on Ludwigshafen ranked among the most important of the year. The factory which was set on fire was one of the largest of the kind in Germany, and great secrecy had been observed as to the work carried on there during the war. It was reported that large numbers of workmen had been drafted into Ludwigshafen some weeks previously. The following official details of the raid were issued by the French Governmenf the following day.

"Eighteen aeroplanes started out at three o'clock this morning to bombard the factories at Ludwigshafen. The Badische Anilin und Soda Fabrik, the most important explosives factory in Germany, occupies the whole of the quarter of Ludwigshafen near Mannheim, and an important annex was recently opened at Oppau, three kilometres from Ludwigshafen.

Bombs on Ludwigshafen

"The aviators dropped 47 projectiles of 90 mm. and 2 of 155 mm. on the first objective, and 36 of 90 mm. on the Oppau factory. All attained their objects. From 6.15 A.M. three enormous fires with yellow smoke were to be seen at Ludwigshafen, and at 6.30 the aviators noticed great masses of smoke enshrouding Ludwigshafen and Oppau.

"The aeroplanes were fired upon but all save one returned safely. According to the pilots, the missing machine was obliged to descend near Ludwigshafen, and was seen to burst into flames after it had reached the ground. It is believed that the descent, which was doubtless due to the enemy's fire, was made normally, and that the occupants of the aeroplane set fire to it so that it should not fall into German hands.

"The expedition, which shows the degree of skill and courage developed by the French pilots, is the finest feat of the aerial arm so far accomplished."

During the course of the day of April 27th French aircraft dropped thirty-two shells on the railway station at Bottwiller and sixty shells on the railway station at Chambley, where they set fire to an ammunition store. The railway station at Arna-

ville and the junction of the lines from Chambley and Thiaucourt were bombarded by night.

On the 28th another French aircraft dropped six bombs on the dirigible sheds at Friedrichshaven. The pilot saw a cloud of smoke rise from the roof of a shed. Twenty-one shells were dropped on the railway station, bridges and works at Leopoldshoehe. During this bombardment one of the French aircraft fell in the German lines.

In the course of the day four German machines were pursued and hit by French aviators. One fell in flames in the enemy's lines near Brimont, and two others came down near the French trenches—one in Champagne and the other in the region of the Ancre—and were destroyed by the artillery. The fourth landed in the French lines at Muizon (west of Rheims). The two German aviators, who were unwounded, were taken prisoners.

In due course, through the hands of their most efficient espionage service, the French authorities began to receive trustworthy information as to the extent of the damage caused by their raiding airmen. The pilot himself sometimes was able to observe the result of his enterprise by the noise of the resultant explosions or by smoke rising from fires, but such an observation was necessarily hurried and incomplete. It was now possible, thanks to the source of information referred to above, together with information received from prisoners, to acquire a better knowledge of the destruction sometimes effected. The picture thus formed confirmed the importance of the bombardments carried out, and showed that French airmen displayed as much precision of aim in dropping bombs as courage in flying.

On March 22nd, for instance, it was discovered that, in the course of the bombardment of Briey railway station and of the junction of the lines to Conflans, Briey, and Metz, provision depots were destroyed and the line was cut.

On April 15th, in the bombardment of the St. Quentin railway station, the central ammunition depot situated in the goods shed and 150 trucks (most of them containing benzol) were burnt to ashes. The fire lasted from April 15th till the following day. All night long the explosions of the projectiles could be heard. Twenty-four soldiers were killed.

On April 28th, in the bombardment of Friedrichshaven, the sheds were struck and a Zeppelin damaged. In the bombardment of the Leopoldshoehe-Lorrach district, the railway station at Haltingen with the locomotive repair works was completely destroyed.

Two express locomotives were badly damaged, and all the stores, including arms and ammunition belonging to the troops guarding the railway, were smashed. The railway line was smashed to atoms, and some considerable time elapsed before it could be used for traffic.

At Lorrach forty-two Landsturm pioneers were killed or wounded, and two aeroplanes rendered useless. At Leopoldshoehe the switch-box was hit and the train service was interrupted between Leopoldshoehe and Haltingen.

This air-raiding campaign reached a climax on June 4th, when French aircraft were successful in various bomb-dropping expeditions. They dropped 203 projectiles, of which 82 were large bombs of 22 pounds each, and 14 shells of 6-inch calibre, weighing 93 pounds each. The efficacy of the explosions was verified at several points, notably at the German aviation depot at Hervilly, south-east of Roisel, where a shed and an air machine were set on fire, the German reserve park for aircraft at Grand Triel, north-west of St. Quentin, where a petrol store was struck. During the preceeding night four shells were dropped on the station of Douai, and a fire was seen to break out near the goods station.

Brave Deeds

Behind these austere details of a grim campaign lay some of the finest deeds in the annals of modern warfare. Air-raiding, embracing as it did, directly or indirectly, every branch of aviation from reconnaissance to battles in mid-air, offered ample scope in this respect. The somewhat misty conditions of early summer had given way to days of full sunshine and unclouded blue skies. "Even war is less horrible now that the sun shines," said a French officer to Mr. Philip Gibbs, the war correspondent, who describes a visit to the French lines in the Champagne district in June, 1915. "The sky was cloudlessly blue, but as I gazed up into a patch of it, where a winged

machine flew high with a humming song, five tiny white clouds appeared quite suddenly.

"'They are shelling him,' said the commandant. 'Pretty close, too.'

"Invisible in the winged machine was a French aviator reconnoitring the German lines away over Beausejour. Afterwards he became visible, and I talked with him when he had landed in the aviation field where a number of aeroplanes stood ready for flight. He was a young man with the keen profile of his class, and a matter-of-fact manner which made one hide one's hero-worship.

"'They touched her three times,' he said, pointing to his machine. 'You can see the holes where the shrapnel bullets pierced the metal sheath.'

"He showed me how he worked his mitrailleuse, and then strolled away to light a cigarette against the wind. He had done his morning job, and had escaped death in the air by half an inch or so. But in the afternoon he would go up again—2,000 feet up above the German guns—and thought no more of it than of just a simple duty with a little sport to keep his spirits up."

Strange indeed is the romance of coincidence. This particular airman happened to be an Englishman, Lieutenant Mark Nelson, who, for reasons best known to himself, had chosen to serve in the French aviation service. And a day later (June 2nd) he was to gain great kudos—and not a little publicity in the French Press—by bringing down a German Aviatik biplane while 6,500 feet over Ypres. He—but better still, here is the story in his own words. "I left the aerodrome," he says, "at 3 A.M. and made off for Ypres. I was flying over that town at a height of 6,500 feet when my observer saw an Aviatik in the distance. The German saw us and flew off. In about ten minutes I was flying above him. My observer fired his machine-gun, but only hit the planes. The German replied, and a bullet struck only four inches from our petrol tank. I then, as a stratagem, caused my machine to fall nearly at right angles. The German, thinking I was done for, shut off his ignition and started volplaning to the ground, but I righted myself about 600 feet from earth and rose above the enemy.

"As we passed my observer fired a couple of rifle shots. The first bullet struck the German in the arm, but he continued to pilot his machine. The second bullet hit the petrol tank. The Aviatik burst into flame and fell. Both the occupants were killed."

A Hazardous Adventure

An incident of an equally daring nature had for its hero another French aviator, participating in this June campaign. His aeroplane arrived behind the German trenches in Northern France, and three bombs were dropped on a railway line and upon an armoured train. A hail of shell was at once directed from the train upon the aeroplane, and one shell exploded a few yards from the aviator's head. He became insensible.

The aeroplane was then 6,000 feet above the earth. The mechanic immediately seized the steering gear of the machine, which, however, began to fall into the German lines. The mechanic threw more bombs as he fell, and was able at the same time to direct the aeroplane so that it came lightly to the ground. He started it immediately, with the result that the aeroplane and its occupants ultimately came safely to earth well within the French lines.

Flight-Lieutenant Juillerot, one of the best known of the earlier French pilots, the same day had as remarkable an escape from death as could be imagined when flying over Mantes.

It was most difficult "flying" country, hills, orchard walls and market gardens all offering a far from pleasing prospect in case of a "forced" landing. When, at a height of 6,000 feet, over Mantes—he had intended flying from Buc to Dunkirk on a Henri Farman biplane—one of the wires caught in the propeller and snapped. Juillerot immediately planed down at seventy miles an hour in circles looking for a likely landing-place. The only field he could see was surrounded by telegraph wires.

Sweeping down to within a few feet of the ground he dived under the telegraph wire and rose again. To have landed at such a speed would have been fatal. At the other end of the field was a row of trees, in which the machine eventually landed

and was smashed to pieces. Lieutenant Juillerot escaped unhurt but was badly shaken.

The German Line

Through the summer and up to the time of the September offensive the German dispositions lay from north to south, with his right flank to the North Sea, the Army of the Duke of Wurtemburg as far south as Lille. The Crown Prince of Bavaria thence held the German line to, roughly, Cambrai. Laon to Cambrai was the front of von Buelow. The troops of von Fabeck lay between the River Oise and the River Aisne. And the armies of von Heeringen, von Einem and the Crown Prince held the salient from the Aisne to the Argonne. It was north that the French were particularly concerned. The High Command anticipated an enemy attack in the immediate future at any point between Arras and Verdun. It was essential that they should be kept hourly posted with information as to the enemy's latest movements. More essential was it that French aviators should achieve the mastery of the air over the whole of this area. And they set about it in the most masterly and scientific fashion.

First it was necessary that every possible new machine should be concentrated in the sector, and the assembled squadrons used to the best effect, each squadron being detailed for some special purpose. The various machines that were now employed were the bomb plane, the chaser plane, and the gun plane. The latter, referred to officially as the "avion-cannon," was a biplane armed with a small Hotchkiss gun on the upper plane in addition to the ordinary machine-gun. Captains Remy and Feure had been killed the previous January while experimenting with this type of machine at Issy-les-Moulineaux. Thus, having realised that for fighting purposes the chief mission of the aeroplane was to act like a gun of immense range, and the bombardment required swarms of aeroplanes and not an isolated machine, the French had equipped and organised a number of their air squadrons with these three types of machines. The object was to disturb and destroy the enemy's communications, either during or on the eve of military developments, so as to impede the arrival of men and shells

from the reserve points in the rear of the lines during the progress of the operations.

The renewed activity of the French air service was the feature of the September battle, and many indications were given of the progress which had been made in this branch of the service since the outbreak of the war. By the end of July the French battle pilots were already hard at work clearing the enemy aviators from the skies, so that their reconnaissance and bombing machines could go about their various missions unimpeded. Fights in mid-air now became of daily, almost hourly, occurrence, and thrilling to a degree. "We had just let go an Albatros, which seemed rather a shy bird," says a French battle airman, describing one such battle in late July, "when a new type of Aviatik appeared on the horizon. We let him rise to a certain height. When he was 7,500 feet we started in hard pursuit.

Battling Wing to Wing

"When within a hundred yards I opened fire with the splendid English quick-firer I use. Suddenly the German pilot put his hand to his head and collapsed. He was only fifty yards from me, so I saw him plainly. I aimed at the other, who threw up his hands.

"It was to no purpose. I fired again, not wishing this ill-omened bird to get home to roost. One more shot and the biplane turned over on fire, and fell headlong amid a cloud of smoke close to the Aisne. I was so happy. It was the fiftieth time I had pursued a Boche aeroplane and the first time I had brought one down."

Said another: "We were chasing a German, two of us. It promised to be a fine run. Clear sky except for one great white cumulus cloud. Up and up on him we came. The gunner in the leading aeroplane of our two was just getting ready to fire when—bang into the cloud went the German. Disappeared utterly. Swallowed up like a pill.

"'All right,' we thought, 'he's got to come out some time.' So we began making great circles round the cloud. We went on waiting. I had begun to wonder if the aeroplane hadn't been dissolved inside, when suddenly the gunner by my side

simply screamed with rage. Out of the cloud below us, falling head downwards, shot the German plane for a thousand feet, and then, righting itself, went off at 100 miles an hour for the German lines. He had us fairly."

At least a dozen aerial duels occurred between French and German aeroplanes on August 11th. A French machine, flying over Colmar, attacked an Aviatik and compelled it to descend. The same day French aerial patrols attacked and damaged two German aeroplanes. Other battleplanes were piloted by two French N.C.O.'s, Bertin and Boyer, who were mentioned in an order of the day for having brilliantly accomplished a dangerous mission over the lines of the enemy, and the former was awarded the Legion of Honour. The two airmen set out together on a mission to a village near which Bertin was to alight four miles farther away than the point determined for Boyer's descent. While passing over the enemy's lines Bertin was wounded in the leg, but continued his journey. Boyer arrived at his destination safely, but in alighting his machine capsized. He immediately set fire to it and started out to regain the French lines on foot. Bertin performed his mission, and on his return perceived the fire near the point fixed for his comrade's descent. He at once alighted, took Boyer as passenger and regained the French lines. Bertin's machine was heavily shelled, not less than nine holes being made in it by bullets and shell splinters, while one of its struts was broken.

When the offensive was already well forward (October 26th) a French pilot, on a monoplane, chased to the north of Dormans one of the enemy's machines, which he attacked at short range after catching it up. The motor of the German machine was struck more than once by machine-gun bullets, and the airman was obliged to come down near Jaulgonne, in the Marne Valley.

The two officers in the aeroplane, one a captain and the other a lieutenant, were captured as they were about to destroy the machine. The latter was captured intact, and proved to be a high-speed biplane of the very latest pattern. Another brave French aviator, away to the north, claimed to have silenced the big enemy gun which had been bombarding Dunkirk. Sergeant Mennerat was his name, and in the course of this

daring operation he passed a very perilous time. The enemy had installed all around the dug-out, that had been specially thrown up and fortified for the reception of the colossal gun, a number of powerful anti-aircraft batteries. As soon as the French aviator made his appearance above the gun the anti-aircraft artillery started to open a long and fierce fire on the machine. At the commencement the shells exploded far from their mark.

Mennerat rose to a height of 2,200 feet, and from here his passenger dropped a number of bombs that completely put the German big gun out of action. Suddenly, however, a missile fired from one of the anti-aircraft guns hit the Frenchman's machine, causing a part of the tail of the aeroplane completely to snap off. The machine rocked about from side to side; little by little it was sinking to earth. The sergeant had been hit slightly, whilst the passenger also was touched by pieces of flying shell. The sergeant saw what would happen if he did not act quickly, and, with a supreme effort, he got his damaged plane under control. With a cool head and a strong determination he turned his machine round, and followed by showers of bullets he carefully piloted it towards the French lines just fifteen miles away.

He eventually reached the lines, and when his machine was overhauled it was found that five large missiles had hit it.

Naturally these extensive operations were not carried out without a considerable loss in both machines and pilots. On August 7th it was announced in the French official communiqué: "Four of our aircraft which took part in the bombardment of Saarbrück have not returned to our lines. One of them is reported to have landed in Switzerland, near Payère, in the canton of Vaud." Of one of these it is pleasurable to recount that, the following day, a German aeroplane passing over the French lines dropped an oriflamme, with a paper attached, which ran, "De Losques and the pilot fought bravely. They are buried at Harbouey, near Blamont." M. de Losques was a young artist who made his name in the *Figaro* by his sketches of actors and actresses in new plays. Always after the "répetition générale" appeared his very personal vision of the players in their *rôles*. His talent promised great things.

His name was another to add to the long list of writers and artists who had given their lives for "La Patrie."

A courtesy similar to that mentioned above was paid to another French airman prisoner of war by a German pilot who flew over Dunkirk. In this case the Frenchman's letter was from an internment camp, and written in somewhat telegraphic style, as follows: "December 6th, 9 A.M.—Leave Dunkirk to reconnoitre Ghent by Ypres, Menin, and Courtrai. Ypres in forty-five minutes. A hundred or two hundred yards from us a white puff of smoke. Only seventy-seven. No danger. Soon, however, a bluish puff of smoke, much more unpleasant. Over Menin frightfully shaken about by the bombardment. Over Audenarde more violently shaken still. Have to do wild acrobatics in the air. Pass through stifling smoke, which gets into one's throat.

"Suddenly over Ghent the motor misfires, evidently heating. Look round, see enormous jet of steam from cylinder, evidently hit by shrapnel. Turn right round, try for Ypres, plane down suddenly to the ground."

The bombing campaign preceeding the September offensive opened on July 16th with an extensive raid—twenty-two bombs and over one thousand darts were dropped—on Arnaville and Boyonville railway stations and military huts at Norroy. For the first time the new French bombing-plane was employed, and the primary objective in every instance was the dislocation of the enemy's lines of communication. This purpose will be dealt with at some length later in the chapter, and meanwhile another phase of French air raiding must occupy our attention.

Incensed by the innumerable German raids on open and defenceless British and French towns, the French, on August 29th, commenced a lengthy series of reprisals. Their aeroplanes in this case bombarded the German railway stations and hutments at Grand Prè, as well as the hutments at Monchentin and Lancon, in the Argonne. This was in return for a particularly vicious enemy expedition of the previous day. Shortly before ten o'clock six German aeroplanes ascended, three from the region of Soissons, and three from the region of Compiègne, and flew in the direction of Paris. They were not able to attain their objective, and only threw bombs on Nogent-sur-Marne,

Montmorency, Mont Fermeil, Rubécourt, and Compiègne. Nobody was hurt, except at Compiègne, where two nurses and a child were killed.

Immediately the enemy aeroplanes were sighted they were bombarded at different points and were chased by French machines. The commander of one of the latter squadrons pursued one of the German machines at a height of 3,600 metres and brought it down to the north of Senlis. The pilot was incinerated, and his machine was destroyed by fire.

A Typographical Slip

To justify themselves in their illegal and unsportsmanlike action the German papers reproduced the French communiqué of August 29th relating to the check suffered by the German aeroplanes in their attempted raid on Paris, but they falsified it in such a way as to give it the opposite meaning. This communiqué was expressed as follows: "The German aeroplanes did not succeed in attaining their objective." The German papers translated it thus: "Sie konnten ihr ziel erreichten," that is, "they succeeded in attaining their objective." The negative was omitted owing to a typographical slip, no doubt.

The *Lokalanzeiger* reproduced the communiqué with the title, "German aeroplanes over (über) Paris." The *Vossische Zeitung* printed in large characters the falsified sentence, but contented itself with the title, "Deutsche flieger vor Paris," "German aviators before Paris." The *Berliner Tageblatt* announced "Deutsche flieger bei Paris," "German aviators near Paris," all over the same text. Finally, the *Leipziger Neueste Nachrichten* gave also, "Sie konnten ihr ziel erreichten," and added in their comment: "The flight of the four German aeroplanes towards Paris has, according to the French official communiqué, attained its object."

The French had barely recovered from this childish affront when, on September 1st, four German aeroplanes bombarded Luneville, an open town, where there was absolutely no military establishment to destroy. "Our enemies," ran an indignant French "communiqué" dealing with this event, "had pushed their refinement so far as to aim distinctly at the populous quarters, and to choose for the operations the day and the hour

of the market. Thus the victims, unfortunately too numerous, were mostly women and children.

"As a measure of reprisal forty of our aeroplanes this morning bombarded the station, the factories, and the military establishments at Saarbrück. The aviators were able to verify that the results achieved were considerable." And again on September 7th the French announced: "In retaliation for the bombardment of the open towns of St. Die and Gérardmer by German aeroplanes, a French aeroplane squadron dropped bombs on the station and the military establishments of Fribourg-en-Brisgau, and it was observed that a fire broke out there. All our aeroplanes returned undamaged.

Reprisal Raids

"Our aeroplanes also bombarded the railway stations of Sarreburg, Pont Faverger, Warner, Iville, Tergnier and Lens.

"Last night one of our dirigibles dropped bombs on the railway lines round Peronne."

The Germans, in their turn, retaliated, on September 12th, by dropping bombs on Compiègne. And by way of reprisal, on the morning of the 13th, a squadron of nineteen French aeroplanes flew over the town of Treves, on which about one hundred bombs were dropped. The station and the Reichsbank were clearly hit.

The same squadron, after returning to its base and landing, set out again in the afternoon and dropped fifty-eight bombs on the station of Dommary Barancourt. Other aeroplanes bombarded from a low altitude the stations of Donau-Eschingen on the Danube (in Baden, where the Danube rises), and of Marbach in a district where movements of troops had been reported. They were able to note the effectiveness of their fire on the objectives aimed at and on a moving train, which was compelled to stop. And another squadron, after midnight, bombarded the junction of Bensdorf, near Morhange, and the enemy's cantonments of Chatel-en-Argonne, and at Langemarck to the north of Ypres.

So this ding-dong method of aerial warfare continued. Again on September 22nd the French announced, "As a reprisal for the bombardments by the Germans of open towns and the

civilian populations of France and England, a squadron of aeroplanes this morning left to bombard Stuttgart, the capital of Wurtemberg.

"About thirty shells were dropped on the Royal Palace and on the station. Our aeroplanes, which were cannonaded at different points on their long journey, returned uninjured to their base." And on October 17th: "the Germans having again recently carried out aerial bombardments of English towns, and one of their aeroplanes yesterday having dropped two bombs on Nancy, a squadron of our aeroplanes to-day bombarded the town of Treves, on which thirty shells were dropped.

"Another party of our aviators bombarded in the night the German aviation ground at Burlioncourt, north-east of Château Salins. Some hangars and shelters were obviously demolished."

The New French Bombing Plane

Official details of the new French bombing plane employed in these raids were kept very secret. It was allowed to be known, however, that the French Government expected the new machine to prove a formidable rival to the Zeppelins, especially in regard to the amount of explosives that could be carried. M. Maurice Farman, the well-known French aeroplane constructor, lifted the veil somewhat in an interview which he accorded a French journalist on August 3rd. "The story of the aeroplane during this war," said M. Farman, "has been one constant series of improvements. The machines we are making are more reliable, able to carry greater weight, and have a longer range of action than those that were built before the war. The *rôle* the armed aeroplane is playing in the war is simply immense, and is only equalled by that of the scouting and fire-control machine.

"Moreover, the system of controls has been very much simplified. In six weeks any man of ordinary adaptability can be made a perfect airman."

One of the notable developments of the air motor during the war is the gain of the fixed motor at the expense of the rotative type. "The triumph of the fixed motor," was one

French airman's answer to the question as to what had most struck him in air developments during the campaign.

The planning of the aerial campaign during this period was an even more scientific development.

As has already been stated, the objective of the French air-raids throughout was the dislocation of the German lines of communication. These bombing squadrons, in spite of the unfavourable weather conditions which had prevailed throughout the month of July, raided no fewer than ten important German railway centres in the area of operations, dropping over 400 bombs, while the chaser planes engaged any protecting enemy aircraft that tried to interfere with the operations. The centres chosen for bombardment were mostly situated in the rear of the Crown Prince's Army, and it was hoped that, thanks to these raids, some of his apparently inexhaustible stock of asphyxiating shells might have been destroyed.

Meanwhile the reader may learn from a glance at the map how effectively the French air services were able to act as an extension in upsetting the enemy's transport. Challerange, for instance, an important railway junction on the Vouziers-St. Menehould and Vouziers-Aprèmont railways, whence were served the requirements of the army operating in the west of the Argonne; Arnaville and Bayonville, to the south-west of Metz; Vigneuelles-les-Hattonchatel, the railway centre for the south-eastern armies operating against Verdun; Autruy, to the north of the Argonne, and Conflans-en-Jarnisy, on the Verdun-Metz railway, had been regularly bombarded by aerial squadrons, which in some cases had numbered thirty-five machines.

The strategic railway installed by the Germans at Vigneulles-les-Hattonchatel, which served both the region of the Colonne trench and that of the Forest of Aprèmont, and where were centred important supplies of every kind, and particularly munitions, was bombarded on the morning of July 30th by a French aerial squadron consisting of thirty-five aeroplanes. These strategic raids continued incessantly. The following day great destruction was effected at the station of Libercourt, a military junction between Douai and Lille. A squadron of twenty aeroplanes dropped on the buildings and the lines twenty-four 3½-inch and sixteen 6-inch shells. The gun-

aeroplanes which accompanied the squadron bombarded a train which had stopped between two stations, and obliged an Albatross machine to land.

A squadron of ten French aeroplanes had already on the morning of July 16th dropped forty-six 3-inch shells and six heavy bombs on the railway station at Chauny, where important depots of material were concentrated. The outbreak of two fires was noticed. A barge blew up on the canal of the Oise.

Another squadron of six machines, on the morning of the 20th, bombarded the station at Colmar. Eight shells of 150 mm. (6-inch) and three of 90 mm. (3½-inch) were launched upon the buildings, the rails, and the trains. The main station and the goods station must have been damaged. No shell was dropped on the town. The French machines returned undamaged. Four aeroplanes, on the 19th, dropped forty-eight shells on the junction station of Challerange, to the south of Vouziers.

During the following night a French dirigible dropped twenty-three bombs on the military station and on an ammunition depot at Vigneulles-les-Hattonchatel. The airship returned unharmed to the French lines.

"Thirty-one aviators," the French official communiqué of July 21st announced, "yesterday bombarded the railway station of Conflans, in Jarny, an important junction. Three shells of 6 inches and four of 3½ inches were observed to have been neatly dropped on the station. The engine shed was struck by a shell of 6 inches. Three Aviatiks were put to flight by our pursuing aeroplanes which accompanied the squadron. One Aviatik was compelled to land rapidly.

"Two aeroplanes yesterday afternoon again bombarded the railway station at Colmar, and four shells of 6 inches and four of 3½ inches fell on the lines." On the 22nd: "Our aviators dropped eight 90 mm. (3½-inch) shells and four 120 mm. (4¾-inch) shells on the railway station at Autry to the north-west of Binarville." In the evening communiqué of the same day: "One of our flying squadrons employed on bombardment duties yesterday evening dropped twenty-eight shells on the railway station at Conflans-en-Jarnisy and obliged two Aviatiks to

alight in their lines"; and again, July 28th: "Our aeroplanes yesterday bombarded (1) the Ypres-Roulers railway at Passchendaele, (2) the German bivouacs in the district of Longueval to the west of Combles, (3) the German defence works on the Brimont Hill near Rheims, (4) the military station of Chatel in the Argonne, (5) the station of Burthecourt in Lorraine.

"One of our aeroplanes last night bombarded a factory engaged in the production of asphyxiating gases at Dornach, Alsace.

"An air squadron to-day bombarded the station of Freiburg, and another squadron of ten aeroplanes from the entrenched camp of Paris dropped forty shells on the station of Chauny.

"A squadron of forty-five aeroplanes left this morning, having as its objective the petrol-producing factories of Pechelbronn, between Hagenau and Wissemburg. Owing to a cloudy sky and frequent fogs, only a portion of the squadron was able to reach the goal. The factories of Pechelbronn and their annexes received one hundred and three shells. Six shells were also dropped on the station of Detwiller, near Phalsbourg, and six on the aviation sheds of Phalsbourg. All the aeroplanes returned to their points of departure."

For the remainder of the year the French aerial campaign varied very slightly from this incessant series of bombing raids. The great development of aviation in relation to surface operations by now, however, must be obvious to all. From an indiscriminate warfare of units and a somewhat egotistical individualism, French war flying now assumed a most invaluable import. The effect of aerial direction on artillery fire in tactical operations has been dealt with previously. Strategically the air raids were directed at every nerve centre of the German Army. Aerodromes, railway junctions and munition centres were invariably the objectives; also military (garrison) towns in enemy territory. The Dalheim aviation camp, near Morhange, and a military train near Château-Salins were heavily bombed on the afternoon of August 4. Thirty-two bombing planes, two days later, escorted by aeroplanes for pursuit purposes, left Paris to bombard the station and the factory of Saarbrück. The atmospheric conditions were unfavourable, the valleys being shrouded in mist and the sky cloudy. Never-

theless, despite the difficulties of finding the direction, twenty-eight aeroplanes reached the goal and dropped on their objectives one hundred and sixty-four shells of all calibres. The escorting aeroplanes kept off the Aviatiks which attempted to bar the way to the squadron. Numerous columns of smoke and fires were observed above the points aimed at. The German "wireless" news itself admitted, August 12, "French aviators dropped bombs on Sweibruecken (in Bavaria) and St. Ingbert, killing eight and wounding several civilians. The material damage is small."

Bombing the Spada Valley

Perhaps the most important French raid during 1915 occurred the following day (August 13). For several months previously the Germans had accumulated at a depot in the valley of the Spada sufficient stores to supply every enemy army facing the French front. Very soon this information leaked through to Paris, and nineteen aeroplanes being sent out, they dropped one hundred and eight heavy bombs and razed the depot to the ground. Railway stations of the greatest strategic importance at Suippe, Bazoncourt, Warmeriville, Pont Faverger, and St.-Hiliare-le-Petit were raided on the afternoon of September 30; also a column marching near Somme Py. Equally valuable was the effect of the seventy-two bombs dropped the same evening on the railway station of Guignicourt; and on the 31st the raid of the French airship "Alsace," which visited the junction of Amagne-Lycquy, the station of Attigny, and the station of Vouziers. It was fired at all along its route, particularly at Vouziers, where it was surrounded with bursting incendiary shells. The airship returned safely to its base after fulfilling its mission. It was struck by some fragments of shells, which did no real damage. The extreme value of the results achieved in the French bombing raids of October 3 and 4 cannot be underestimated. In the first instance, sixty-five aeroplanes bombarded the station of Vouziers and the aviation ground near the town and the station of Challerange. Over three hundred shells were dropped on the objectives which were struck, cutting in two a train travelling near the station of Laon. In the second case a squadron of aeroplanes dropped

forty large calibre bombs on the Sablons railway station at Metz. Other aeroplanes carried on the bombardment of the railway lines, junctions and stations behind the German front.

The attack by air on the railway station at Vouziers (the German Crown Prince's base in the Argonne) by sixty-five French aeroplanes—the greatest number that had as yet operated together in war—was carried out on similar lines to those successfully employed before.

More and more Raids into Germany

The French were delighted with this success, and demand was growing for still more reprisal raids into Germany until the enemy had definitely renounced the bombardment of unfortified towns. At this instigation, on August 22, four French aeroplanes flew over Mulheim, dropping bombs on the railway station and the electric transforming stations between the station and the town. The airmen also flew over Fribourg, and threw bombs in the vicinity of Sarrebourg. During the operations in Champagne French airmen flew at a height of only 400 to 500 yards behind the German lines, effecting reconnaissances and regulating the French fire. They were subjected to an intense bombardment, and many of them returned with their machines riddled with bullets, their petrol tanks smashed up and their engines damaged. One of them had a most dramatic experience. At a height of 400 metres his observer was hit by a bursting shell, which grazed his skull. At the same moment the pilot was hit in the stomach by a bullet and rendered unable to control his machine.

The aviators were carrying five bombs, to be dropped on certain strategic points. The machine, left to itself, began to drop. Seeing the pilot's condition, the observer hastily removed the detonators from two of the bombs, but had no time to do this with the three others, for the machine made a sudden dive forward and came down at a distance of only fifty yards from the German trenches. Fortune, however, now smiled at him. The bombs did not explode, the shot and shell whistling round him left him untouched, and he finally escaped from this fearful adventure practically unhurt.

A German war correspondent thus describes a raid by Allied

airmen upon Vouziers: "About half-past four in the afternoon of October 3 some twenty French airmen approached Vouziers and began a concerted attack on the town. Three of the aeroplanes advanced first in a group, flying at a great altitude, and as soon as they were right over the middle of the place a heavy bombardment was begun. German airmen promptly ascended, and it was a wonderful sight to watch how the aeroplanes circled around one another, each trying to bring the enemy down with machine-gun fire. Our anti-aircraft guns also entered the fight, but none of the French airmen could be brought down. Suddenly the entire squadron turned about and disappeared amid the clouds."

Amongst the three great air raids undertaken by the Allies at the end of this month, the most interesting was without doubt the one so successfully accomplished by the sixty Allied war planes on August 25, when the British, French and Belgian machines dropped a shower of explosives on the Germans in the Forest of Houthulst, in Belgium. The result obtained from the military standpoint was excellent.

The Chief French Air Raids

It was an admirable moonlight night, and signs of anxiety were noticed in the German lines when the war planes were seen approaching their front on Houthulst. Immediately the electricity was extinguished, and the Germans began to make use of their anti-aircraft guns, of which they had numerous batteries all along the line; but they had counted without the blinding brightness of the moon, which rendered the shafts of light from their searchlights absolutely useless in the silver-grey light, in which the Allied aeroplanes were almost invisible. The enormous number of shells fired by the Germans were ineffectual.

About four tons of incendiary bombs and explosives were thrown during the entire course of the raid on the enemy barracks and depots. A large number of the war planes made as many as three successful journeys to get fresh supplies of bombs. The thunder of the enemy's guns vied with the bursting of the explosives, so that pandemonium seemed let loose. The bombs employed were on an average 4.7 and 6 inch.

Other principal French air raids of the year were as follows:

Date	*Objective*
Aug. 22 ..	Lens, Henin, Lietard, and Loos railway stations bombarded.
,, 25 ..	80 bombs dropped on Tergnier (Aisne) and Noyon (Oise).
,, 26 ..	Asphyxiating gas factory at Dornach.
	Mulheim electrical installation.
	Iviory and Cierges station.
,, 28 ..	Chatel (Argonne) railway station.
Sept. 20 (N.)..	Railway junction at Amagne Lucquy, east of Rethel.
,, 21 ..	100 bombs dropped on Bansdorf junction.
Oct. 10 ..	Railway stations of the rear front of Champagne.
,, 14 ..	20 aeroplanes bombarded the station of Bazancourt.
Nov. 28 ..	Ten machines bombarded the sheds of Habsheim.
Dec. 14 ..	Air flotilla of eleven aircraft raids Mulheim.
,, 15 ..	Shells of 155, 90, and 120 millimetres dropped on Habsheim aerodrome.
,, 17 (N.)..	Sablons station at Metz.
,, 19 (N.)..	Fresh bombardment operations over the station of Metz-Sablons.
,, 20 ..	Twenty-six heavy bombs dropped on Mulhausen goods station.
(N.)..	Night air-raid.

CHAPTER VI

AIR WAR IN THE MEDITERRANEAN

From German South-West to the Dardanelles—A Desert Skirmish—French Aviators in the Serbian Retreat—The Italian Aviation Service—German and Austrian Vandals of the Air—The Bombing of Venice—Italian Semi-Rigids in Action—Through the Clouds to Savogna—Aircraft at the Gallipoli Landing.

If an equable climate, unclouded blue skies, and an almost unnaturally clear visibility presaged good flying country, the Mediterranean was the ideal locality for the war in the air. Unfortunately, however, the Mediterranean blue seas and skies were as treacherous as they were beautiful. In a single moment of time the "Simoom"—the local terror among winds—would come sweeping up from the south, from the heat-dried, arid wastes of Tripoli and the Kufra, and would whisk everything from its path, on sea and shore and in the air alike. No aircraft could venture the "Simoom" and live; many were wrecked most rashly in the attempt.

For the purpose of this history, at least, the air war in the Mediterranean—valuable time and space cannot be spared to every minor campaign in this world-embracing war—extended over many thousands of square miles of tropic seas, jungles and swamps, great unexplored tracts of country in the heart of Africa, deserts and wastes, savage and Oriental countries and empires. "A-a-e-er-ooplanes"—craft of nigger imagination—were doing great work for General Smuts, driving the wily and courageous enemy commander from German South-West Africa. And the Germans were in possession of a plane of their own, a really first-class craft, which did considerable execution among the ranks of the South Africans. "We were just marching away, about fifty of us from the Scottish," says a young colonial soldier of this campaign, "when the alarm was sounded near us by the look-out, and the cry

'Aeroplane!' came floating down from another look-out on a hill some way off. The camp is very much spread out, I may tell you. Everybody, except those on fatigue, etc., has to be right out of camp from dawn to breakfast time, drilling, etc. Well, there was not time to get out of camp or reach the trenches on the outskirts, so we just had to shelter where we could. —— got down beside the railway embankment, and I got between some half-buried water tanks. Mine was the better protection, unless a shell had fallen right into my hollow; but still I did not feel too happy, because the water tanks are the aviator's objective. I was pretty sure the two first bombs would miss us, but No. 3 was coming straight for my hollow till a few hundred feet off the ground. It is jolly hard to judge time in moments like these, but I should say the shells took half a minute to drop the 1,000 feet. I got down flat when the bomb was near the earth, and then with a terrific roar it burst, and a cloud of flame, black smoke and dust rose outside my barrier of water tanks and sandbags. Bits of shell went whistling away overhead, and three telegraph wires were cut and dropped near me. I was certain the shell had burst just outside my barrier, and was surprised to find it had done so 40 yards away. We seem to live for years while the bombs are falling."

It was everywhere a great story, a stirring chapter in the history of war aviation. Hardly can the imagination of the "temperate zone" lend itself to the very real terrors of flying in sub-tropical countries. Hurricanes, storms, the blistering heat of the sun, which filled the air with innumerable treacherous "pockets," played greater havoc with the ranks of the flying services than ever enemy anti-aircraft shells. And for the work of the pilots and observers, it was at once the strangest mixture of romance and daring, tragedy and adventure. Haphazard—haphazard as the war by air itself—here are amazing incidents of aviation which, in 1915, all took place between the Gibraltar Straits and the Karachi Gulf. In the gaining of his D.S.O. Flight-Lieutenant Dacre, on November 19, flew over the Gallipoli Peninsula, and in spite of serious trouble with his machine, succeeded in carrying out a most difficult operation, and afterwards returned safely to his base. Even

an unimaginative *London Gazette* announcement allowed that: "Great nerve and courage were displayed in prosecuting an attack under very adverse conditions." This is a story from Tenedos of a seaplane which flew inland over the Dardanelles to reconnoitre. She was returning over Yeni-Shehr at a height of about 2,000 feet, when, just as she passed over the windmills, some hundred or so, or possibly more, Turkish soldiers, who were hiding in or behind the windmills, fired a volley at her. In the time that a man may take a breath there was a deafening crash, and when the smoke had cleared away those windmills had been removed! It was an extraordinary sight. That little cruiser had sighted and hit, and had completely wiped out those Turks almost before they had had time to see the result of their shots.

Helping the "Queen Elizabeth"

Far away in the desert (April 28-29) a small British mixed force was sent out from Ismailia to endeavour to surprise the Turkish camp. The enemy, however, had moved during the night towards Fordan, but finding all our posts on the alert, they retired to Bir Mahadat. They were located again at dawn by British aeroplanes, and about midday our cavalry succeeded in coming up with their rearguard, harassing their retreat and taking a few prisoners. Back again in the Dardanelles, though an aeroplane observer directed the *Queen Elizabeth's* fire, owing to the extreme difficulty of indirect fire (from the Gulf of Saros) over the mountain range, and the invisibility of the enemy ship, the British Dreadnought was unable to fire many shells before the *Goeben* took flight.

Information was received from Dedeagatch on August 2 in Paris to the effect that a German aviator had flown over Bucharest and had been chased off by Roumanian pilots. It was stated that the machine which thus infringed Roumanian neutrality was at a height of about 1,500 feet, and carried a searchlight. With glasses the black cross on the wings, which is the mark of German war aeroplanes, could be plainly seen.

A sailor on a river gunboat, describing the fighting at Kut-el-Amara, gives the following interesting glimpse of aerial activity at this period in Mesopotamia: "Immediately after

this," he says, "a seaplane glided down into the river, and the pilot came alongside us and told the captain he had a map to explain. They got out and came on board. The consultation between the two officers was brief. We soon knew what the seaplane's mission was to us. It was orders for us to go under the enemy's nose under cover of darkness and destroy an obstruction near the town, which was there to prevent us from going farther up the river. Flying was especially difficult in Macedonia, as landing-places were non-existent, the ground very hilly, and it was very cold. Despite this the airmen during November made fifty-four flights and obtained valuable information. They bombarded important camps, especially at Uskub, Ishtip and Strumitza with great effect, particularly at Strumitza, where they caused an absolute panic. Their exploits created great admiration among the Greek people and army. The first aviators, who landed at Salonica on October 19, encountered great difficulties in installing an aviation park, as the mobilised Greek army had taken over all suitable places. Nevertheless the first squadron was ready in less than a week, and effected the first reconnaissance on October 31 in the Gevgheli region. Perhaps the finest exploits of the whole war of the air in the Mediterranean were those of the French aviators who took part in the Serbian retreat.

With the Serbian Army

Twelve of the French pilots decided to follow the Serbian Army in the retreat from Nish to Kraliero, and then through Prishtina to Prizrend. They repaired their machines at night-time with old pieces of cloth and piano wires. They used their petrol to the last litre, without saying a word to the Serbian General Staff. They suffered hunger without complaining.

Two of them, one a very popular pilot and the other an officer, anxious to give important and accurate news quickly to the Allies, flew from Prizrend to Avlona, flying through a pass not more than 600 feet broad in the Drin Valley, despite a thick fog. Finally, after having crossed the mountains, they landed at Avlona before the astonished Italians, who gave them an enthusiastic reception. There only remained in their tanks enough petrol to allow them to fly for two more minutes.

Air War in the Mediterranean

The entrance into the war of the Italian Aviation Corps eclipsed every other aerial event of the year in the Mediterranean. It was not without its influence on the general situation on the Western and Russian fronts. Most seriously affected was the Austrian plan of aerial campaign. Innumerable pilots and machines—old types and insufficient—had to be brought down hurriedly from the Austro-Russian front. Germany at this time had her hands full in supplying her own, by now, extensive aviational needs, and was unable to reinforce her ally. Austrian airships were not worthy of consideration, a mere handful of out-of-date craft. Italy, however, both with regard to heavier and lighter-than-air craft was handsomely equipped. Though the giant Caproni machine was yet a thing of the dim and distant future, the Italian airmen were equipped with a really excellent monoplane, the "Gabardini," and Italian airships—semi-rigid type—were the finest of their class in the world.

Italian Engines and Planes

The "Gabardini," not unlike the French "Nieuport" in general appearance, was fitted with an 80 h.p. Gnome engine, built in Italy at the works of the Fabbrica Italiana Motori Gnome at Turin. Employed to a great extent at the pre-war civilian flying-school at Cameri, the monoplane already had several non-stop flights to its credit, including Milan-Rome, Milan-Turin and Milan-Venice, and was to prove of inestimable value in the first months of Italy's entry into the war. The airships were even more efficient. The first Italian semi-rigid, the P 1—P, "Piccolo," small size—was constructed in 1908. The P 1 was 200 feet long, of 40 feet diameter, had a motor of 100 h.p., and a speed of 35 m.p.h. She was not very successful in her trials, and in 1912 the Government purchased a "Parseval" from Germany.

The next home-constructed product was the M class—M, medium size—with engines of 500 h.p. and a speed of 48 m.p.h. She was 250 feet long and 55 feet in diameter; the largest semi-rigid ever constructed.

The next class, but of the same type, was the Forlanni, and the "Citta di Ferrara" was the first ship of the class. She had

a capacity of 424,000 feet, a length of 233 feet, a diameter of 59 feet, and three 85-100 Isotha-Fraschini engines. Almost the first Italian act of war was an airship raid on a group of Austrian destroyers anchored at the mouth of the River Budoc. Despite an extremely violent anti-aircraft bombardment, this airship—the naval dirigible M 2—succeeded in dropping several bombs with good results. A sister craft flew over Pola and dropped bombs on the railway station, the petrol depot, and the arsenal on the evening of May 30th. All the bombs exploded on their objectives, and a great fire broke out in the arsenal. The dirigible was subjected to intense firing from the anti-aircraft artillery, but was not hit at all, and returned uninjured. Again, on June 11th the Italian Naval Staff announced that Pola had been raided by the dirigible Aeronairre. It dropped several bombs, which all exploded on points of military importance.

It must be explained that the Austrians were as unfortunately placed, geographically, as with regard to material and personnel. The Carnic and Julian Alps, which for centuries had afforded the finest natural barrier against an invading army, now proved a veritable death-trap to the Austrian airmen. Their out-of-date machines, not too well blessed in the matter of climbing powers, were unable to make passage over these high mountain ranges. Aerially for the most part Austria had to act on the defensive. Thus the Austrian armies in the field and the highly strategic ports of Trieste, Pola, Rovigno, Fiume, and Zarra were left exposed to every manner of Italian attack from the air. The Italian plan of aerial campaign was to reserve her airships for all tactical operations on the home side of the mountains, while the aeroplanes were entrusted with all strategic raids into the heart of Austria-Hungary. Worsted at the outset, the enemy immediately retaliated—as often as opportunity served—by an unprecedented campaign of vandalism on Italy's defenceless, ancient, and historic cities.

Venice was very soon in a similar situation to either London or Paris. Lighting regulations were enforced. On the night of the first raid, May 24, 1915, the excitable Italians rushed about the squares of the city; and the waterways, thronged with gondolas, looked like a fleet of shadows in the dark. Songs

and cries filled the unlighted city, and the people could scarcely persuade themselves to go to bed. Silence reigned only at 2 o'clock in the morning. Then two Austrian aeroplanes swept over in the darkness of the night, supported by a gunboat and two destroyers far out at sea.

Austrians over Venice

En route these enemy pilots had attempted to bomb Ancona and Jesi. At the former place the attack was particularly directed to interrupt the railway line, but caused very little damage; at the latter it was driven off by a severe anti-aircraft bombardment. Their subsequent raid upon Venice was both of a vicious and promiscuous nature. Eleven bombs were dropped altogether on the Venetian littoral. But by this time the Italian searchlights had come into operation. In the long, graceful silver beams could be seen silhouetted the lithe, dark forms of aeroplanes and a squat dirigible climbing swiftly to the attack. The latter rose high, and then swooped down on the enemy planes. The Austrians did not wait for an engagement at close quarters, but turned tail and fled, and were chased over the lagoons and out over the blue waters of the Adriatic by the Italian aerial squadron.

It was an exciting and stern chase. The guns of the Italian aircraft opened fire on the pursued, but the latter dodged and ducked like a covey of wild birds hoping to escape the fowler's shotgun. The Austrians fled out fanshape, bent on escaping at all hazards. One Austrian aeroplane was reported to be winged, but even in its crippled condition it finished its flight. It was barely dawn below, but awakened early by two strident siren whistles, the streets were soon filled with excited people watching what was to them the novel sight of a hostile aeroplane escorted by bursting shrapnel. Bombs rained down in all directions—on the Corte delle Colonne, at the Castello, in the Rio della Tana, at San Luca, and in the Rio dei Carmini. The San Luca bomb was an incendiary one, and covered the ground with petrol. Fortunately no damage was done. At 5 o'clock a second Austrian airman followed, and endeavoured to drop two bombs on the bridge connecting Venice with the mainland. They missed, however, and fell in the lagoon. Four

other bombs were dropped, but in vain. Typically Italian, Venice's answer to the bombardment was an outburst of flags, which covered the city, all the Allies colours being flown.

Treachery was also allied with wanton destruction in the Austrian view-point of the employment of aircraft as engines of war. A foolish, almost childish, and most lying attempt at propaganda was carried on by means of enemy toy balloons. These craft were employed to drop into the Italian lines ridiculous proclamations inviting the Italian soldiers to desert, offering easy employment, good food, and money for the arms which they brought in at the following rates: For a rifle with equipment, 8s. 4d.; for a machine-gun, £20; for a gun, £80; for an aeroplane, £80; and for a horse, £6. The reply of the Italian soldier to this insulting inducement proved hardly profitable to Austrian arms. Another, and perhaps more justifiable, attempt was made by an Austrian airman upon the person of King Victor Emmanuel. The King was watching the firing of a battery on the Carso when an enemy aeroplane flew over the Italian troops, passing just over the spot where the Sovereign was standing. The officers accompanying the King begged him to leave, but the King reassured them with a smile and remained calmly where he was, witnessing with great interest an engagement which took place between Italian aeroplanes and an enemy aviator. The latter threw a number of bombs, some of which fell two hundred yards from the King.

Early in July first Cardinal Gasparri, then the Bishop of Rimini, both of them prominent ecclesiastical dignitaries, and eventually the Pope himself, addressed letters to the Austrian Emperor, expostulating on this new and inhuman warfare of the skies. But it seems that nothing short of the fearless and vigorous action of Hildebrand, who, as Gregory VII., brought German Emperors to terms, would have any effect in these modern times. The only enemy reply to these notes was an attack of three Austrian aeroplanes on the undefended town of Bari, where they dropped eight bombs and killed six persons. A similar attack on Brindisi (June 2) by these aerial barbarians, who had learnt their lesson well from those outlaws of civilisation who bombarded Scarborough and sank the *Lusitania*, was commented upon by the Italian Press Bureau

as follows: "During the course of the afternoon of the day before yesterday the people of Bari saw a biplane with an Italian flag flying over their town, and cheered it, as was quite natural, since it bore the national colours. The following morning, about dawn, the few people who were in the streets again saw a biplane with an Italian tricolour flag, and, of course, they saluted it once more with joy. They had hardly done so, however, when the treacherous visitor dropped a bomb over the Piazza Roma, which burst with a loud explosion and killed a boy of fourteen, Michele Ranieri, a homeless waif who had spent the night sleeping under the porch of the palace belonging to Signor Vito di Tullio. Immediately the aeroplane, with its Italian flag still treacherously floating, dropped a second bomb in the Via Crisancis."

Equally inhuman were the methods of the Austrian airmen on the actual war-front, as may be judged from the following incident. Towards the end of the action on one of the days of battle along the Isonzo, a column of Italian wounded was descending a hill-side in order to find accommodation in the motor-ambulances waiting for them, when an enemy aeroplane, dropping to about 300 metres above the wounded, opened a vigorous fire upon them with its machine-gun. The Austrian aviators persisted in this "chivalrous" attack for a long time, manœuvring above the Italians and firing continuously.

Four other raids were made on the defenceless city of Venice. The first of these "punitive" expeditions was announced with great gusto in an Austrian "official." "One of our seaplanes yesterday afternoon bombarded four coast forts at Venice," ran the enemy communiqué of August 16. "All the bombs, with the exception of one, exploded within the fortifications. Of five hostile airmen who ascended to pursue our men, two were forced to land by machine-gun fire and two abandoned the pursuit after some time, while the fifth followed our machine close to the Istrian coast, where he was obliged to turn back without having been successful.

"Our seaplane returned safely, in spite of the heavy fire of hostile war vessels and forts."

Two further enemy aeroplanes, having persistently attempted surprise raids over Italian territory on September 3, 5, and 6

respectively, succeeded in reaching Venice on the afternoon of the 7th. Bombs were dropped on the Venetian lagoon, but without causing any damage. One of the machines was hit by the Italian anti-aircraft guns, and was forced to descend into the sea. The two officer airmen were made prisoners by Italian destroyers, and the machine sank.

The Venice Aerial Guard

By far the most damaging air-raid on Venice was that of October 25. Curiously enough, the evening before a banquet had been given to more than 200 guests at the ex-Restaurant Pilsen, in honour of the French and Italian aviators who had been specially assigned as an aerial guard over the old city of the Doges. The Mayor of the town made a speech in which he highly lauded the undaunted courage of the aviators who risked their lives daily in defending the town, with all its historic treasures, against the enemy's aerial incursions. Soon after 10 o'clock in the evening the Austrians made two attacks at brief intervals, dropped several bombs on the town, some of them incendiary, and in the course of a third attack, made an hour afterwards, three bombs were thrown on the town, two of which did no damage, while another, which dropped in the courtyard of an almshouse, set fire to a pile of wood.

It was no reflection, indeed, on the Venice aerial guard that the enemy airmen were able to approach the town, as the sky was slightly covered by mists, and the Austrians took advantage of the situation. For justification and as a "military" result the enemy were able to claim that the beautiful painting of Tiepolo, on the ceiling of Di Scalzi Church, was completely destroyed, without hope of any possible restoration, and only a few bare fragments remained. The bomb dropped by the aviator struck the roof near the centre, and exploded evidently before it had entirely passed through the ceiling, thus causing much greater damage, as there was no great resistance from the air. The Minister, Signor Barzilai, went to Venice specially, and visited the church with the Mayor and a number of art experts. They found the floor of the church littered with plaster and fragments of ceiling, and that the beautiful work of art was entirely destroyed.

"I left the base with an observer at 9 o'clock in the evening," said the naval officer who was in charge of the Austrian seaplane, and who was described by the Hungarian journalist to whom he accorded the interview, as a very young man, who left the naval school just before the war began, "and arrived over Venice at 10.15. We were over the town a quarter of an hour, and arrived back before midnight. Originally we intended to throw bombs on the naval arsenal, on the railway station, on the electric depot, and on other military objects as a reprisal for the aerial bombardment of Trieste. It was a beautiful night, a full moon allowed us at the outset to see everything clearly, but afterwards thick clouds obscured the view. I cannot describe the route we took, for it would reveal our starting point. The railway line outside the city on the long bridge gave us the first hint as to where we were. At this point the moon disappeared, and we flew towards the city in total darkness. We could hardly find it, for the Italians are very cautious; not one lamp is lighted in the streets, not one illuminated window can be found, making it almost impossible to direct oneself at a height of 3,000 feet."

Italian Airships

With these few past events in his mind's eye, there is a danger that the student may overestimate the Austrian proportion of the war in the air over the North Adriatic. It was the Italians, not the enemy, and particularly the Italian airships, which proved the prime factor in this theatre of operations. The navy had paid great attention to the air-service, and possessed what was believed to be the most efficient dirigible in the world, smaller than the Zeppelin, but possessing a high speed, a large radius of action, and the ability to reach great altitudes. There were ample well-trained crews.

The dirigibles had proved their efficiency already by heavily bombarding Pola, Monfalcone, and other Austrian positions, and it was because of the enterprise and daring of the air service that the Austrian fleet lay hidden behind the islands of the Dalmatian Archipelago. During May, on the Friuli frontier, on the night of 27-28, Italian airships carried out successful raids into the enemy's territory, causing serious

damage. A large number of bombs which were dropped hit their mark.

The next airship operation, that of June 9, proved hardly so auspicious. An Italian dirigible made a raid upon the Austrian coast, and particularly Fiume. In the latter port the torpedo works and submarine yards originally founded by the famous British inventor, Robert Whitehead, were bombarded, and damage was caused to the Danubius navy yard, where the Dreadnought *Szent Istvan* had been built. The airship dropped bombs on a factory near the town, where submarines sent from Germany in pieces by train were being put together. It was on the return journey, however, that disaster overtook the daring aviators.

Having delayed their return too long, the Austrians were able to send up aeroplanes in pursuit. The strain on the engine of the dirigible became too great. She was obliged to alight in the water in the neighbourhood of the island of Lussin. Meanwhile, the unfortunate crew, having set fire to the airship that it might not fall into the enemy's hands, threw themselves overboard into the sea and were taken prisoners by the crews of the Austrian torpedo-boats.

Monte Santo, entrenchments opposite Gradisca, Ovciadraga, on the Gorizia-Dornberg line, all of them positions of great military value, were bombed by the Italian dirigibles on the night of June 17. By way of retaliation of further Austrian raids on Italian open towns, dirigibles again flew across the Adriatic on June 20 and, arriving over Trieste, they bombarded the Sant Andrea ammunition factory, which lies slightly to the north of the city. The Italian aeronauts were careful to confine their attention solely to such targets as ammunition works, and they did not attempt to damage public or private buildings. A portion of the factory was set on fire and some outbuildings destroyed by the bombs. Port Salvore, on the Istrian peninsula, opposite Tagliamento, which was being made use of by the Austrians as a sheltering base for destroyers, was also bombarded.

The July 5 attack on the Dornberg-Pravcina railway junction serves again only to illustrate the immense influence which was being effected upon the strategic plans of a surface battle by

the introduction of aircraft. This junction served the only direct line of communication between Trieste and Gorizia, so soon to fall into Italian hands. Numerous high explosive bombs were dropped, which considerably damaged the rails, and also the station buildings at Prefacina. Similar strategic raids were made on other points of the enemy's line of communications at the rear. The Stabilimento Tecnico at Trieste, where considerable quantities of war material were being prepared, was seriously damaged the same night. Italian airships also effectively bombarded the environs of Doberdo.

In July Italian airship activity was particularly noticeable in the neighbourhood of Gorizia, where again they were perpetually menacing the enemy's lines of communication. On the 16th Gorizia was again bombarded, also the enemy's camps on the northern slopes of Mount San Michele in Carso, with satisfactory results. The dirigibles, which were continually lit up by the Austrian flares and made the object of heavy artillery fire, all returned safely to the Italian lines at daybreak. The Stabilimento Tecnico at Trieste was again raided on the 7th of the month, and on the 23rd Italian airships dropped bombs on San Polaj and the railway to Nabresina. All the bombs exploded with excellent results. Another air raid was also made on the same railway, a heavy weight of explosives being dropped on the mark with great effect. On each occasion the airships returned safely, though they had been heavily bombarded by guns and rifles. The most noteworthy airship operation of August was the series of raids on the night of the 6th. In the first of these a dirigible bombarded the Austrian camp at Lake Doberdo (Carso Plateau) and, although fired at by the hostile artillery, returned undamaged to its base. A second airship effectively bombarded the railway line from Opcina (about four miles north of Trieste). On its return it was attacked by an Austrian seaplane, which dropped three incendiary bombs at it from above, but was put to flight by the fire of the airship, which returned undamaged to the Italian lines. The last of these attempts was made on Pola, where repeated incursions had been made with good results, and several bombs were dropped. For some unknown reason this ship collapsed in the sea on its homeward flight, and the crew,

composed of three officers and three men, were made prisoners by the Austrians.

Other notable Italian airship raids of the year were as follows: On September 19 dirigibles made a raid on the Austrian camp at Aisovitza, where forty bombs were dropped. The crossing and viaduct of the Nabresina Railway were also bombarded. On the night of November 2, during a storm, an airship bombarded enemy encampments in the Gorizia Plain. The airship, which was discovered by the light of star-shells and searchlights, and was subjected to uninterrupted artillery fire, returned without damage. On the night of November 8 another airship, rising above a thick bank of clouds, reached the district between the Isonzo and the Vippacco. "The airship subsequently came out of the clouds near Savogna, and was discovered by the enemy's searchlights. Anti-aircraft guns fired at her, but she got away and returned safe and sound."

Weather, wind and tide, a lack of suitable bases, and a too close proximity of such bases to the Turkish lines; every possible deterrent, without avail, combined to check the effectiveness of the work of aircraft at the Gallipoli landing, the next biggest field of operation in the air war in the Mediterranean at this time. The air was not an easy problem. The March equinoxial gales had barely subsided when British aeroplanes flew out night and day to reconnoitre the enemy dispositions on the Peninsula, to direct the operations of the mine-sweepers in detecting floating mines, and to range the fire of the Allied naval heavy artillery on to every possible enemy position. The reports of the reconnaissance pilots in particular proved invaluable. In one case an observer returned with the information that the Germans, who were conducting the defence, had organised mobile batteries of heavy ordnance at various points. The position of these batteries was being constantly changed, making it difficult for the Allied ships to get the range. A large number of enemy guns had also been placed in positions so well disguised that it was sometimes difficult even for the airmen to locate them. On March 28 it was from aircraft that news was first available of the Turkish evacuation of Fort Dardanos. For the first time that day Allied airmen encountered enemy machines of obvious German origin.

Subsequently it was established that since the beginning of the month the Germans had supplied a squadron of Taubes to Turkey. These craft were employed for the most part in carrying out reconnaissances over the Dardanelles and the Bosphorus.

The R.N.A.S. in Gallipoli

Airmen added to their laurels in July by directing the fire of the *Queen Elizabeth* in the sinking of a Turkish transport from a range of 18,000 yards. It was the most wonderful feat of modern gunnery. Without the *Queen Elizabeth* seeing the ship she was aiming at, or even the sea upon which that ship rode, this was made possible by the co-operation of the observers of the R.N.A.S., who directed the fire. During the period June 9 to 24 French airmen made eighteen reconnaissances a day between sunrise and sunset, that is to say, fifty hours of flight. On June 22 one French squadron added another exploit by regulating the fire of French howitzers on a German Albatross, which had fallen on the ground between the trenches after a disastrous fight with a British plane. In an official review of the operations of the French Eastern Expeditionary Force during the period from June 25 to July 9 there was the following:

"During the night of July 4-5 the battle was begun. . . . Finally, aeroplanes of a grey colour marked with black crosses made several flights over our lines and dropped bombs, which did no harm.

"At twilight our soldiers saw, flying at a great height above their heads, a numerous squadron of Allied aeroplanes proceeding in a north-easterly direction. They returned shortly afterwards to the aerodrome. Our men counted them anxiously, for a strong northerly breeze had risen and was blowing in dangerous squalls. Ten, twelve, fifteen—there was the seventeenth—all the aviators had returned safe and sound. Their objective had been the enemy aerodrome at Chanak. A bomb weighing 150 lb. had been dropped on the enemy's principal hangar, and had started a fire; while other projectiles had covered the surrounding camp with a shower of splinters."

It was a French airman who was responsible for a most

useful piece of work before the Australian trenches early in July. The Turk, who had been taught above all things the art of self-concealment, so that his real numbers should never be accurately known, had lain for days in his lines without any sign of activity. The Australians, chafing at their inactivity, were beginning to wonder if he was still on their front in any strength, when the French airman passed over the lines, flying very low. The effect was instantaneous. It proved too much for the stolid Ottoman infantry, who, rising in their trenches, poured volley after volley at the intrepid airman. It was then seen that every line of trench was fairly bristling with bayonets, showing the importance which the enemy attached to this particular position.

On the morning after the supply ship *Carthage* had been sunk another French aviator, who was flying several hundred feet above the sea off Cape Helles, saw a black spot in the water beneath him.

Circling round, to enable him to observe it more closely, he at last made out the form of a German submarine under water, moving towards a British transport which was heavily laden with troops and munitions.

Immediately the aviator flashed a wireless signal to the British, and then, swooping down to a few feet of the surface of the water, he dropped two bombs. These did no damage to the submarine, but taking warning, she sank to greater depths.

When the enemy thought enough time had passed he raised his periscope above the surface. But the aeroplane was still circling near at hand, and once more a couple of bombs fell close alongside the black patch. Then the submarine finally disappeared.

"Much might be written on the exploits of the Royal Naval Air Service," said General Ian Hamilton in his dispatch of December 11, 1915, in which he pays the following tribute to the splendid work of French and British aviators alike: "But these bold flyers are laconic, and their feats will mostly pass unrecorded. Yet let me here thank them, with their Commander, Colonel F. H. Sykes, of the Royal Marines, for the nonchalance with which they appear to affront danger and death, when and where they can. So doing, they quicken the

hearts of their friends on land and sea—an asset of greater military value even than their bombs or aerial reconnaissances, admirable in all respects as these were.

"With them I also couple the Service de l'Aviation of the Corps Expeditionnaire d'Orient, who daily wing their way in and out of the shrapnel under the distinguished leadership of M. le Capitaine Cesari."

CHAPTER VII

THE NEW YEAR

1916 Opens Quietly in the Air—Stagnation on the Franco-British Front—Brilliant Italian Raids—Boelke and Immelmann—The Coming of the Fokker—Air Raids in the Balkans—Gallipoli—The Daring of M. Paulhan—More about the Fokkers.

JANUARY, 1916, opened inauspiciously in the air. No thrilling aerial duels were fought out over the trenches to relieve the monotony of the stagnant battle. The grey bombers that, in the blue clear sky of the closing days of 1915, had swept out, ranging the enemy's "back areas" far and wide for information, fretted miserably in mud-bound aerodromes miles behind the lines. Like manacled giants, the great armies lay sullenly face to face, silently suspicious, unable to move gun or bayonet, blind to their opponent's intentions. For the first time the army commanders, by its continued absence, awoke to the fact of the aeroplane's existence in war, and prayed for a break in the cloud. The situation possessed every thrill of a popular melodrama. The long agony of the darkness, the continuous grey mist of the day, pitilessly shrouding the earth from the air, even field from adjacent field, accompanied by the fierce, incessant shriek of the storm winds overhead, wrapped and enfolded the waiting armies, until at last the sun would come peeping through the clouds, and every available aircraft would be hurried into the air, willingly enough, with all the fate of the battle depending on their efforts.

The weather conditions varied to a considerable extent down a very extensive fighting front. When, on January 10, a strong gale of wind prevented any activity with the British aviators, farther south the French were extremely busy. In the neighbourhood of Dixmude three armoured aeroplanes attacked and brought down two hostile aircraft, one of which fell into the forest of Houlthulst. Unfortunately, a Frenchman

was also forced by the combined efforts of a German plane and a battery of anti-aircraft guns to make a landing at Woumen, and was captured by the enemy intact. That day, strangely enough, the Germans also claimed to have brought down an English biplane at Tournai, when, according to our official records, no British plane went up.

The Germans were extremely alert on the following day, but their activities yielded nothing more than a raid by two airmen on Dunkirk, where they dropped eight bombs, causing only insignificant aerial damage. Great aerial activity prevailed farther south over the Italian front. Austrian aviators bombarded several military camps in the neighbourhood of Gorizia, which achievement was somewhat lessened by the fact that a strong Italian air squadron had meanwhile bombed successfully, not only an Austrian aerodrome at Gandolo, to the north of Trent, but also the Trent and Roverto railway stations, and barracks near Volano.

The Italian air service, favoured with ideal weather conditions, had been more active than any throughout the long months of winter. Their airmen had proved themselves both zealous and highly skilful in their numerous attacks on the Austrian military positions. Trieste had been raided successfully in broad daylight on October 24, 1915. Important strategic objectives of every sort were bombarded. In particular, Austrian military encampments suffered disaster at the hands of the daring Italian aviators. Bainsizzer, an important enemy troop concentration, was visited on several occasions. Three extensive raids were carried out, on three different days, upon similar positions in the Carso plateaux. Austrian railways were dealt with mercilessly. The Italian successes in this respect included the bombing of the station of Vallebaca (Idria) Gorizia, Trieste railway, and Dino, Nabresina (twice), San Daniele (on three occasions), Refenberg (twice), Dottoliano, Vogersko, and Aidussina railway stations. Aisovitza and Aidussina aerodromes were similarly visited on November 24, as also was Volano, the seat of an Austrian command, on November 13.

These raids were all most daringly and brilliantly executed. "Under the most adverse atmospheric conditions imaginable,

and in the teeth of a tempestuous wind," reported the Italian High Command, on November 21, "one of our flying squadrons renewed the incursion on the enemy's aviation camp at Alcevuzza, on which 100 bombs were again dropped. Our machines returned unharmed to our lines." On January 13, 1916, sweeping down through a fierce bombardment, another Italian airman dropped several bombs on Austrian barracks, between Tione and Brogezzo in the Gindicaria valley.

That same day was to prove disastrous to British airmen. Four of our machines failed to return to their aerodromes. The reason is to be discovered indirectly in a most interesting announcement which appeared also that day in the German communiqué. At this time the German air service was at its best. Never before, never since, were so many first-class airmen numbered among its ranks. Two of our unfortunate pilots fell to the unusual skill of such truly great enemy airmen as Boelke and Immelmann. In recognition of their exceptional services, on January 13 the Kaiser bestowed upon both the Order Pour le Mérite, an unusual and unprecedented honour.

The Coming of the Fokker

Undoubtedly both Boelke and Immelmann were masters of their art, for art it certainly was. But they were aided to a large degree by the use of an extremely speedy and serviceable monoplane that now made its first appearance over the German lines. This was the celebrated Fokker machine. Popularly accredited with a speed of over 110 miles per hour, this plane was fitted with an armoured engine of 150 horse-power, and was afterwards to create considerable consternation in the Allied camp.

The monoplane was designed to carry only a pilot, who was armed with two machine-guns, one of which was arranged to shoot automatically through the revolving blades of the propeller. Each gun was provided with a belt of 250 cartridges.

These machines hitherto had been kept well in the rear of the German lines, and were intended to attack French machines when out on reconnaissance work. The method adopted was to wait until a French machine was seen approaching. Orders were then telegraphed to the German pilot to

go up and wait for the arrival of the French machine, and then attack it direct. In this way, on January 15, Boelke added another Frenchman to his already lengthy list of victories.

It must not be imagined, however, that the French airmen were now outclassed. One has but to judge from the following incident. While on a reconnoitring expedition over the German lines, a machine, of which Captain Sallier was the pilot and Lieutenant Legall the observer, was attacked suddenly by one of these same new Fokker monoplanes. The German pilot swooped out of a cloud and began firing at them with one of his machine-guns. An explosive bullet struck the petrol tank of the French machine, and it immediately became enveloped in flames. Its occupants realised that certain death awaited them, but with supreme courage they divided between them the maps and important documents in their possession, and tore them in small pieces as the blazing aeroplane fell to earth. Almost equally daring was the repulse by a single French machine, on January 17, of two German aeroplanes which were on their way to bomb Dunkirk.

"Flying Country"

While, strictly speaking, it cannot be said that these various branches of aerial activity were influenced to any appreciable degree by the nature of the locality, a sufficiently wide and level surface was always necessary for the airmen to rise from and descend to the earth; "flying country" was a very real factor in the war in the air. A good landing-ground was equally essential to the individual airman. In this respect, conditions varied with differing types of aircraft. Where a slower type reconnaissance and bombing aeroplane would land at a speed of from 30 to 40 miles per hour, this "landing-speed" was almost doubled in the case of the faster fighting scout. If a reconnaissance plane could land in a distance of 100 yards, the scout would require double that distance to come to earth with any degree of safety. The machine with the greater speed was the one to be studied.

Within an area of twenty miles of the firing line it was necessary that there should be situated, at fairly regular intervals, wide, level fields or commons, suitable for aerodromes.

In this respect the Flanders country was almost ideal. A flat terrain, sparsely wooded, stretched far on either hand. An airman brought down suddenly to earth by engine trouble or by enemy shell-fire found no shortage of possible landing-grounds. Practically, one might say that, in an area bounded on the west by the line Dieppe-Paris, thence as far east and south as Rheims, turning then sharply to the north-east, and thus avoiding an out-running spur of the Ardennes to Namur, and again as far west as the line Antwerp-Maestricht, no point was higher than 600 feet above sea-level. And this wide expanse was contained throughout in a gently undulating plateau!

Sharply dissimilar was the contour of the Austro-Italian battle-line. Save for one narrow gap between Udine and the Gulf of Venice, and the always doubtful and dangerous alternative of flying over the sea, the only resource of the Italian battle-pilot was to cross and re-cross the towering mountain-range of the Middle Alps, at an average altitude of 8,000 feet! However, as compensating this very real disadvantage, it must be mentioned that Italy, situated as it was in an almost sub-tropical latitude, was favoured with a more certain climate. The grey mists and clammy fogs of the Flanders plains were foreign to the blue skies of the Adriatic. Hollowed out into a natural cup by tall mountain ranges to the north and east alike, it was entirely free from sudden squalls or gales of wind, and flying was possible for some hours almost every day, even during the most unsettled time of the year.

Thus in four days, January 18 to 22, not only was a strong squadron of Austrian raiding aeroplanes severely repulsed, but Volano was again raided, and Italian airmen brought down and captured two Austrian pilots, Naval Ensign Alexander Ulmansky and Sub-Lieutenant Karl Kubasck, of the Corps of Naval Constructors.

Similar, if not more unfavourable, geographical conditions prevailed at Salonika, where, though the town itself lay at the southern edge of a wide, high plateau, north, west and east the latter was locked by impassable mountain ranges. Encounters in mid-air were startling to a degree, and all of a highly romantic nature. Aircraft were something of a novelty to a

populace which, prior to the war, possessed little knowledge of, far less visual acquaintance with, flying.

When, one day, the Allied seaplanes, participating in the bombardment of Porto Lagos, ventured so far inland as Xanthi, their appearance caused a panic among the population. The objective of this bombardment was the destruction of the main railway line passing north of Dedeagach, and the fire of the heavy guns of the ships was directed by the seaplanes. Apart from their observations, the information received from over the border agreed that the damage done was considerable. Several bridges and culverts of the railway line were destroyed, and great havoc was also wrought on whole stretches of the line itself.

French Planes over Monastir

To complete this destruction, on the morning of January 23, 45 French aeroplanes—the largest air raid yet carried out in the Balkans—set out to bomb Monastir, where there had recently been some concentration of troops, both German and Bulgar. The flight to Monastir took just over two hours; 204 bombs were dropped on Monastir, and 100 on Gevgheli, Boyandzi, and Gorentze. When over the former town, at nine o'clock, a violent wind sprang up. As the vast squadrilla, pitching in the boisterous north wind, but flying in regular order across the blue sky, circled over the town, its pilots saw black clouds of smoke rolling up from places where the leading bombs had fallen. All the French machines were vigorously shelled by the enemy batteries round the town, but every one returned unhurt to Salonika by noon.

An amazing occurrence in this same Salonika district was a tragic accident which befell a German aeroplane. For several days previous to January 18 the German pilot had been trying to reconnoitre the Allied positions on the eastern flank, near the Gulf of Orfanos. Laying a course across the gulf towards the Bulgarian frontier, this day he met a squall and at the same moment had engine trouble. In full view of a British cruiser his machine dived towards the sea, at first evenly, then turning over and over. One of its two occupants fell before it hit the water; the other sank with the machine.

Still farther east, on the Gallipoli Peninsula, similar and worse geographical conditions confronted the British and French aviators. From Morto Bay (Camber Bay), in the extreme south-west corner, to north-west, Little Anafarta (Suvla) Bay; and again as far east and north as Bakia Burnu (Cape Xeros), the surface of the countryside was literally pocked with ranges of high hills and steep valleys, towering cliffs and high broken plateaux. Aeroplane observation was extremely difficult, and flying conditions most dangerous, by reason of the changing, variable winds and the multitudinous pockets of rarefied air. That the British aviators were undeterred by these numerous obstacles, however, may readily be seen from the following account of Mr. Arthur Ruhl, an American correspondent with the Turkish armies at this time.

From the Enemy Viewpoint

On the one hand, this account says much for the accuracy of the British bomb-dropping; on the other, it shows the great moral advantage thereby accruing in the panic caused among the Turkish ranks. It was just before dawn of a delicious summer's morning, when Mr. Ruhl was first aroused from his journalistic slumbers by the most unattractive chorus of British bombs dropping in the near vicinity. "In the fresh, still morning," said Mr. Ruhl, "with the camp just waking up and the curious Turkish curry-combs clinking away over by the tethered horses, our aerial visitor added only a pleasant excitement to this life in the open, and we went on with our dressing with great satisfaction, little dreaming how soon we were to look at one of these little flying specks quite differently."

This, indeed, was but the mildest foretaste of what was to come.

It was about midday when the second and really serious British air-raid occurred. With "the sun," said Mr. Ruhl, "blazing down on the crowded flat; on boxes, sacks, stevedores wrapped up in all the variegated rags of the East, shuffling in and out of the ships; on gangs digging, piling lumber, boiling water, cooking soup; officers in brown uniforms and brown lambswool caps; on horses, ox teams, and a vast herd of sheep, which had just poured out of a transport and spread over the

plain, when from the hill came two shots of warning—two shots in rapid succession.

"The gangs scattered like water-bugs when a stone is thrown into the water. They ran for the hill, dropped into trenches; to the beach, and threw themselves flat on the sand; into the water—all, as they ran, looking over their shoulders to where, far overhead, whirred steadily nearer that tiny, terrible hawk.

"A hidden battery roared, and—*pop!*—a little puff of cotton floated in the sky under the approaching flyer. Another and another—all the nervous little batteries in the hills round about were coming to our rescue. The bird-man, safely above them, drew on without flinching. We had looked up at aeroplanes many times before and watched the pretty chase of the shrapnel, and we leaned out from under the awning to keep the thing in view. 'Look!' I said; 'she's coming right over us!' And then, all at once, there was a crash, a concussion that hit the ear like a blow, a geyser of smoke and dust and stones out on the flat in front of us. Through the smoke I saw a horse with its pack undone and flopping under its belly, trotting round with the wild aimlessness of horses in the bull-ring after they have been gored. Men were running, and, in a tangle of wagons, half a dozen oxen, on the ground, were giving a few spasmodic kicks.

"Men streaked up from the engine-room and across the wharf—after all the wharf would be the thing he'd try for—and I found myself out on the flat with them just as there came another crash, but this time over by the Barbarossa across the bay. Black smoke was pouring from the Turkish cruiser as she got under way, and with the shrapnel puffs chasing hopelessly after, the flyer swung to the southward and out of sight.

"Officers were galloping about yelling orders; over in the dust where the bomb had struck a man was sawing furiously away at the throats of the oxen (there were seven of them, and there would be plenty of beef in camp that night, at any rate); there was a dead horse, two badly wounded men, and 100 feet away a man lying on his face, hatless, just as he had been blown there; dead, or as good as dead."

The glamour of these aerial adventures of the Near East,

as was only to be expected, caught the popular fancy, where the sterner, if anything, more useful reconnaissance and bombing patrols that were daily maintained along the Western Front were taken more as a matter of course. The Flanders battlefield lent itself neither to glory nor to romance; but where the one was lacking, the innumerable diabolical inventions of modern science had severed the last thread of the picturesque in battle, glory crept in unawares. The numerous decorations awarded to British and French flying men at this time in the north of France tell their own story; they tell more—of a long and unremitting period of activity, never without danger and hardship.

The long and short of it was that, in the period of four weeks previous to January 22, the Royal Flying Corps had brought down certainly nine, and probably two enemy machines in addition, as against a loss of thirteen. The enemy also held the day in the matter of bombing raids, with a total of thirteen, as against six British during the same period. This comparison, however, is modified by the fact that we used 138 machines, including escorts, for bombing raids, while the enemy employed approximately twenty. Also, for 1,227 British aeroplanes that had crossed the lines, the number of Germans was estimated as being only 310—the last figure is determined by reducing the actual anti-aircraft observations to the probable number of machines.

Further, it must be pointed out that all this aerial fighting took place over or behind the German lines, and owing to the prevailing strong west wind the enemy machines which were damaged could glide homewards, while ours could not. For this reason it is as yet impossible to give an accurate comparison of the relative loss. Hostile machines were reported as "brought down" or "driven down" when they were seen to fall to the ground uncontrolled, but the enemy probably suffered many casualties of which our officers, who were scrupulously careful in their reports, were not certain. In many instances the Germans broke off combats and descended rapidly to their own lines. In such cases no claim of causing a casualty was made.

In one single day twenty-seven hostile aeroplanes were

encountered, and three captive balloons were attacked. "We have maintained our supremacy," was the terse comment of the British Commander-in-Chief. A large German supply depot at Le Sars (north-east of Albert) was raided on January 17 by sixteen British aeroplanes, which caused considerable damage. During the day there were nineteen air encounters, in five of which enemy machines were driven down. But the lion's share of the fighting at this period fell to the French aviators.

Beating the Zeppelin

For the destruction caused at Epernay, an undefended town raided by Zeppelins on January 25, the French carried out a strenuous and most successful reprisal raid on January 27. Eighteen bombs of 6 inches and 20 of 4 inches were dropped to some effect on the station and the military establishments at Freiburg-im-Breisgau. A squadron of fourteen French aeroplanes, on the 29th, dropped numerous bombs on Barzali, and a watchful Paris defence squadron successfully frustrated a Zeppelin attempt on Paris the following day. If the previous Saturday night's attempt on the same city, which caused twenty-five deaths and wounded thirty-two, was odious, this visit proved simply ridiculous.

Ten bombs were dropped without result, and the Zeppelin, which was bombarded, was compelled to return hastily to the German lines.

In no branch of military aviation did the French airmen excel their prowess in the aerial duel. As a notable example, there was the case of M. Paulhan, the well-known pre-war aviator, who, after having attacked enemy aeroplanes that had just effected a bombardment, pursued one of the machines that he had defeated in a battle, where he showed the greatest coolness. He hovered over the machine, which fell in the enemy's country, to drop a bomb on it. For this daring feat M. Paulhan received an honourable mention in the French Army Orders.

Always unusually daring, and ever evincing the most brilliant initiative, the wonderful deeds of this French battle airman were, perhaps, best described in the words of their

official eye-witness. "Our warplanes, powerfully armed, belonged to a squadron commanded by Lieutenant F., who was previously in command of a flying school," this gentleman recorded of one such encounter between three French warplanes and two armoured Fokkers. "On January 7 two of these machines, piloted by Corporal P. and Sergeant de G., went up to bombard certain objectives. Corporal P., his mission accomplished, was returning, when he observed a French Voisin machine attacked by a Fokker. The two aeroplanes were so close that it was difficult for the warplane to intervene without danger to the French aviator. However, it fired three shells in succession, at 1,500 yards, 1,000 yards, and 500 yards. The enemy's machine was not hit, and it continued to gain on the Voisin. Then by an audacious manœuvre Corporal P. dived down right on the Fokker and fired twice in quick succession. These projectiles found a target, and the Fokker burst into flames, while the German batteries opened a vain fire on the warplane, which landed uninjured behind the French lines.

"The second Fokker was brought down by Sergeant de G. Attacked by an enemy machine, that was very fast and attempted to reach him from below, the sergeant suddenly reduced his speed, and, forcing his aeroplane abruptly upwards, allowed the enemy to pass him below. The German pilot, seeing his danger, swerved to the right to escape the French aeroplane's gun, but he was too late. The French pilot swept on him at full speed, and his machine-gun opened fire at under fifty yards. A bullet pierced the petrol reservoir, and the Fokker fell blazing into a forest. The French machine was planing towards the landing-place when another Fokker appeared in full chase. The enemy's machine-gun opened fire, and it was only by brilliant manœuvring that Sergeant de G., who had no more ammunition, succeeded in escaping the onslaught."

Those Fokkers! The balm of their ill-merited and brief notoriety was to soothe the wounded German pride for many long months after they had been consigned to the capacious scrap-heap of war. Meanwhile, true to his national instincts, the grist was artlessly turned to the general mill. Berlin was

very jubilant over the recent successes of her airmen along the Western Front. The new Fokker, it was publicly announced far and wide, was unquestionably a most effective machine, and—usually in greatly superior numbers—these aircraft had latterly accounted for several of our own. The great feature of the Fokker was the mounting of the machine-gun in such a manner that it could be fired horizontally, clear of the propeller, thus enabling successful attack to be made against a hostile plane. But here again—if it could really even be so called—the momentary advantage was one of means and not of men.

CHAPTER VIII

DUNKIRK, ZEEBRUGGE, AND THE BELGIAN COAST

The Ceaseless Patrol of the R.N.A.S.—"They did not Advertise"—A Weird Adventure—The Spider of the Air—The Gallantry of Lieutenant Reid—Some Explanations as to Seaplane Launching at Sea.

"MAY 4, 1916.—Nineteen machines carried out a raid on Mariakerke Aerodrome, and fifty 65-lb. bombs were dropped. Heavy anti-aircraft fire with incendiary shells was encountered; two of our machines were lost. The rest returned in safety.

"*May* 20, 1916.—Flight Sub-Lieut. A., in a Nieuport scout, when four miles off Blankenberghe, observed a German seaplane. Diving down to 4,500 feet, the pilot succeeded in getting above and behind the enemy, and fired twenty-five rounds at close range. The enemy machine was observed to swerve and dive into the water. It sank, reappeared, and finally sank."

In such tabulated form the reader may best gauge the nature and extent of the work carried out by the British naval airmen at this period. Dunkirk, which from the beginning of stationary warfare till the final evacuation of Belgium was the base of aerial operations against the coastal front line, from the Dutch frontier to the Nieuport piers, was also throughout the headquarters of the Royal Naval Air Service. The operations carried out were much the same as those against a land front line, save that the naval element entered in, as the British side of the lines was, in this case, the North Sea. Photographs were taken continuously; spotting was carried out for monitors by wireless machines; flights of fighting scouts patrolled the area, and a large amount of bombing was done.

The history of these squadrons during the war was one of ever increasing progress and success.

The organisation then consisted of four groups of twelve machines each. The machines were of types which to-day are

almost obsolete even for training purposes, such as Morane monoplanes, Voisins, and Henri Farmans. Daylight raids were carried out on twin-engined Caudrons as far as Ghent, forty miles beyond the lines, by pilots who had no machine-guns or weapons of defence, the weight-carrying capacity being utilised for bombs. On one occasion a pilot was pursued ten miles down the coast by a German aeroplane, which flew a few feet behind him, firing continuously. He could see the German airman looking round the engine to watch the effect of his bullets. The British machine landed on the Allies' side of the lines safely, although it was almost shot to pieces.

This year, 1916, saw the first fighting squadrons in action. Continuous patrols were kept up between Dixmude, Nieuport, and Ostend, for the protection of the French and Belgian spotting machines, and also for the protection of Dunkirk. Artillery observation, with the aid of wireless telegraphy, was carried out against the famous Tirpitz battery of four 15-inch guns near Ostend, officially known as "T 4." The British artillery bombarding this battery was protected by continuous circular patrols.

The "Short" Land Machine

Night bombing with heavy machines, the Short land bombers, was presently undertaken. These were the largest night bombing machines then in use on any front, and carried 112 lb. bombs. In the summer of this year the first Sopwith triplane was sent out, and, in order to give the enemy the impression that there was a large number of them in use, it was flown continuously by many pilots. Night flights against raiding Zeppelins were also undertaken in this area to a considerable extent. The vast amount of ordinary work done, day by day, proved of the greatest value to the Naval and Military High Commands. Here, for instance, is an almost unique record for two days' flying:

May 21.—(*a*) During the early hours an Allied raid was carried out on the enemy's aerodromes and places of military importance. Sixteen R.N.A.S. machines dropped thirty-eight 65 lb. bombs and seventeen 16 lb. bombs on Mariakerke Aerodrome. One seaplane dropped one 100 lb. and two 65 lb. bombs

on the Solvay works, Zeebrugge. All these machines returned safely with one exception.

(*b*) An attack was made upon Dunkirk by hostile aircraft. Several British machines went up with the object of cutting off the enemy on their return journey, in the vicinity of Nieuport. Flight Sub-Lieutenant D., in a Nieuport scout, attacked three machines at a range of 400 yards. He opened fire on one machine, and observing another about 900 feet above him making seawards, gave chase and fired the rest of the tray. He then reloaded, and climbing to 10,000 feet encountered a large two-seater, which opened fire at long range. Flight Sub-Lieutenant D. opened fire and observed tracer bullets entering the machine, which started to smoke violently and nose-dived towards the sea. Another officer who was in the air at the time states that he observed in the same locality what appeared to be a machine on fire, enveloped in a volume of black smoke. A fourth hostile machine was encountered and fired upon until Sub-Lieutenant D.'s ammunition had been expended.

(*c*) Flight Sub-Lieutenant E., in a Nieuport scout, when six miles out to sea, over Zuydcoote, observed five hostile machines together and another one a little way behind. Climbing rapidly, the pilot attacked the last one at the close range of 100 yards. The hostile machine suddenly dived steeply, but the pilot was unable to ascertain the result as he was attacked from behind by three scouts, probably Fokker biplanes, at a range of 100 feet. Flight Sub-Lieutenant E. turned round to meet them, and, reloading, continued to fire. These machines, however, made good their retreat over the lines.

(*d*) Flight-Commander A., in a Nieuport scout, followed the raiders out to sea, opening fire when off Mariakerke. He closed with three machines, one of which was seen to topple over suddenly and nose-dive out of sight. Reloading, the pilot attacked another machine, which, after a few rounds, was observed to dive steeply. The third machine did not attempt to engage, but flew back over the lines. It is probable that one, and possibly two, of these machines were destroyed.

May 22.—Flight Sub-Lieutenant G., in a Nieuport scout, observed five hostile machines in close formation and one farther

in the rear, which he attacked at very close range and from underneath, the tracer bullets entering the fuselage. The observer of the enemy machine fired a few rounds and then broke off, as though killed or wounded, our machine still being an easy target. The other hostile machines drew away.

Preventing an Invasion of England

The invaluable series of raids on enemy positions outlined by these individual exploits had commenced early in March, when the bleak winter of fog, and mist, and storm at last had broken and aerial military operations become a practicable proposition. Primarily, and most successfully, this campaign was intended to frustrate the enemy plan of invading England, and reached a climax with the series of extensive raids carried out on the morning of April 23 and during the next day, the 24th. The first attempt was made in the early hours of the morning of March 20, when a combined force of approximately fifty British, French, and Belgian aeroplanes and seaplanes, accompanied by fifteen fighting machines, attacked the German seaplane station at Zeebrugge and the aerodrome at Houltade, near Zeebrugge. Considerable damage was done, and the machines carried on an average 200 lb. of bombs.

The German aerodrome at Mariakerke, in spite of most inclement weather, was bombed on the morning of April 23, which raid may be said to have brought to a close the spring campaign of the naval airmen in Flanders. *En route,* the British machines were heavily fired upon, and one, encountering an enemy aeroplane, succeeded in driving it to the ground. From the point of view of damage effected, this raid was most successful.

The following morning (April 24) a further attack was carried out on the same objective in co-operation with the Belgians, and a large number of bombs were dropped. Heavy fire was encountered by all machines, but there were no British casualties.

During the course of the same day a British aeroplane attacked an enemy seaplane about five miles off Zeebrugge. The enemy pilot was killed, and the machine dropped, the enemy observer falling out while the machine was still at a

height of 3,000 feet. The hostile seaplane crashed into the sea and sank.

The rare mention of individual exploits will be noticed. The policy of the R.N.A.S., then and up to the day that it was incorporated with the R.F.C. into the Royal Air Force, was to avoid, if possible, all public attention. Except in the case of some exceptional feat the aviator was never mentioned by name. Flight Sub-Lieutenant Simms, for instance, whose body, poor fellow, was picked up at sea, on February 20 attacked and shot down a German aeroplane, which fell in flames a short distance in front of the Belgian lines, the combat and result being in full view of the Belgian soldiers in the trenches. Flight-Lieutenant Ferrand returned to duty after being missing for two days. He set out from Nieuport to make a reconnaissance. Experiencing some engine trouble about midday, he was obliged to make a descent on the sea. He managed to keep afloat until the evening of the next day, when he was fortunately rescued by a Danish steamer and taken to Ramsgate.

With regard to many and similar experiences, it is to be wondered that the Admiralty did not more frequently relax this rule.

Here is an instance that deserves publicity. It was a night in early March, and the weather report predicted a gale and snowstorms within the next twelve hours. None the less at ten o'clock a brilliant moon shone in a cloudless sky, and so all the serviceable machines in the squadron rushed off into the moonlight, to bomb an important Boche aerodrome thirty miles over the lines.

Two of the airmen who started met with some interesting experiences before they returned. Apparently they reached the vicinity of their objectives without any untoward incident, and then ran into a bank of clouds. Luckily, through a break in the clouds, just over the target, they were enabled to drop their bombs on the hangars with good effect. Then they turned for home. But the storm which had been predicted had come up behind them and they quickly found themselves in a blizzard. They could see neither earth nor sky, so they flew due west by the compass.

Suddenly the two compasses in the machine pointed in different directions. After a rapid consultation they decided that, as the observer's compass appeared to be working more freely, they would be guided by that, although they had serious misgivings as to its accuracy.

Occasionally, through a break in the clouds, they could see the ground, but could not recognise any landmark. They kept the compass pointing west and flew on. Luckily their engine was running well. At last the storm cleared off and they found themselves, much to their surprise, over the sea. Heights well away to their left front indicated the coast, so they made for them with all speed.

Lost in the Clouds

They flew over a town and harbour at 1,000 feet. No "hate" was sent up at them, so they decided that they could not be over Hunland. They failed to recognise the place, however. And as there were a large number of lights showing they argued that they were probably over Holland. Wherever they were, their petrol could only last a few minutes longer, as they had been flying nearly five hours, so they wisely decided to land while visibility was fairly good. They chose a suitable field near a railway line and made a good landing.

As they climbed out of the machine, cramped and half frozen, they felt in no cheerful mood. Internment for the rest of the war stared them in the face, for they were fully convinced they were in Holland. They destroyed their maps and started out along the railway track with the intention of finding a station. After half an hour's tramp and much forcible language they met two railway workers.

"Is this Holland?" shouted the two lost ones in unison.

"No, monsieur, this is Havre," came the unexpected reply.

The incident was never reported; the pilot's official account was forwarded with a number of similar documents, like a cargo of coals in a sack, to some dusty, gloomy Admiralty cellar—and there abandoned. But, to the theme. These few details were disclosed in the more enlightening and intimate form of a letter. How much better one visualises the incident in such a manner; in the racy, spirited dialogue of the individual

soldier, without personal gains to bolster, or losses to deprecate. A sapper in the Royal Engineers—an ex-university undergraduate turned soldier "for the duration"—in a letter to a friend in Oxford deals vividly, and with no little appreciation, of just such an aerial occasion; a thrilling encounter between a Hun and a British naval airman on or about March 7, 1916. One's imagination is swept on involuntarily from his opening sentence, until, almost with reluctance, one discovers that the breezy little sketch is ended. This morning, as he writes, "the air was full of German planes." Says that undergraduate: "I saw one flying overhead at a great height. Gun after gun picked it up, followed it across the sky with the deadly puff-balls, and then gave it up to the tender mercies of the next battery as it passed out of range. The Boche flew on quite undisturbed, making for the town about three miles back from here.

"Then I saw that one of our big fighting planes had risen, and, flying low over the trees, was hurrying in my direction as if trying to get as far away from the German as possible. So it seemed for the moment, and then I saw he was getting well behind the enemy and would rise to his height to attack him on the return journey. For some little time I watched the two machines—the one circling slowly over the town in the distance; the other now well away towards the firing line and rising rapidly, finally disappearing out of sight into a cloud-bank. The Boche plane stayed some little while unchallenged, then turned in a leisurely sort of way and started for home.

"The morning was ideal for flying, the air calm and very clear, with here and there a heavy cloud floating slowly across, but not threatening rain, and everything seemed to point for a safe return for the invader. He came towards me down wind at the side of the road, slowly and thoughtfully lifting the mud 'Archies.' They seemed to realise this, and hardly a shot followed him as he sped across the sky. He passed over my head and made away for home, skirting along the edge of a large dark cloud that stretched away towards the horizon. An old fellow in long waders was standing knee-deep in the ditch at the side of the road, slowly and thoughtfully lifting the mud

up on the banks on either side—' ditching,' I believe you call it. He saw me looking up at the now distant plane, and laughed. ' Looks as if 'e owned the place,' he said; ' but, Gawd! if they did bring him down! '

"I glanced up again, and as I looked the plane made a sudden swerve away from the cloud-bank, and a larger and darker form seemed to spring out of the shadow, just as you have often seen a hunting spider dart out of its hiding-place and seize some wretched insect. It was the fighting plane I had seen rising some time before.

"Almost before one could realise what was happening the machine-guns were firing, and the German was planing madly downwards for his life. At first I thought it was merely a ruse to help him shake off his big opponent, but the volplane was turned into a spiral, and I knew that something was wrong. For a few seconds he came down steadily, and then seemed to lose all control. The radius of the spirals got less and less, and the descent more steep till the plane was pitching headlong downwards, whirling round and round as it fell, like a dancing Dervish dropping through space.

"In amongst the wonderfully varied mixture of the noises of the ' Front,' which at first seem so strange, but which one quickly comes to disregard, there came a new sound, a crash, which might possibly have meant the falling of a shell some distance away, but to me it brought back memories of a still, fine morning on the Port Meadow at Oxford. Do you remember? It was the first time that I saw Death.

"I looked up again at the spot where the short duel had taken place, but the sky seemed empty, absolutely innocent of planes! My ' spider of the air ' had slipped back to his hiding-place again.

"Later.

"M'sieur has got back in his ' voiture ' from—where he has spent the day. He says that six civilians were killed this morning by a bomb dropped from a German aeroplane. I am beginning to realise that my ' spider of the air ' was really a true Knight-Errant after all."

It seems almost incredible, but official reports can find nothing further to relate of these glorious actions than a hint

that hostile aircraft would have proved more successful but for "the vigilance of our Dunkirk Aerodrome, under Wing-Commander A. M. Longmore."

The Story of Lieutenant Reid

Surely there was no more dramatic revelation in the war than the stirring story of Lieutenant Reid's prowess, told in a few hastily scrawled words on a forbidding-looking German official post card from a naval airman prisoner to his wife at home here in England, written from Osnabruck internment camp. The writer of this post card was one of the pilots of the three seaplanes reported by the Admiralty communiqué of March 26 as missing. Before we get to the story, however, some explanation will be necessary.

The Zeppelin hangars at Tondern (Schleswig-Holstein) were the British airman's main objective that day of March 26. Altogether—despite the loss of three valuable machines—it proved a most successful visit. For instance, two German official communiqués (Army and Naval) strove strenuously to belittle the results of the damage achieved. "No damage was caused," stated the former, published on March 26. "Not less than three of them, including a battleplane, were brought down by our anti-aircraft section (which had been previously warned)." According to the latter, on the 27th: "Our naval aeroplanes attacked the English naval fighting forces, and succeeded in scoring a number of hits. . . . The attack failed completely." Yet, from these same two statements may be gleaned the admission that, "bombs were dropped in the neighbourhood of Hoyerschleuse," and "Two armed fishing steamers on outpost service fell victims to the English aircraft." And this information may be further amplified by a statement which later appeared in the *Politiken*, an always trustworthy source, to the effect that: "Travellers who have arrived at Copenhagen from the south report that British seaplanes bombed the neighbourhood of Hoyer and Tondern, burning a granary at Randerup and bringing down a German battle hydroplane, which was taken to Tondern by automobile on Saturday afternoon completely smashed."

The account estimated that no fewer than five German

cruisers, twenty destroyers, five battle hydroplanes, and the Zeppelin L14 took part in the engagement. It added also the significant statement that: "Considerable importance must be attached to the attack, as showing that England's defence has not been neglected, and that the British authorities are busy in providing means to prevent Zeppelin raids. The attack was carefully prepared and boldly carried out."

Facts must speak for themselves. The Home authorities by this time had decided that, to combat the Zeppelin campaign at all successfully, it was necessary to carry the air war into the enemy's country. Accordingly arrangements were made by the Admiralty that a British light cruiser squadron, escorting a certain number of seaplane-carrying ships, should proceed under cover of the night to a rendezvous off the North Frisian coast; and from thence seaplanes would be sent up to bombard the German airship sheds in Schleswig-Holstein. The cruiser squadron selected was the famous Harwich flotilla under Commodore Tyrwhitt. Unfortunately, however, the weather, which overnight had promised so well, changed suddenly in the early hours. A heavy wind blew up from the north-east, that made the sea surface extremely choppy and dangerous for launching the seaplanes.

How Seaplanes are Launched

This manœuvre in itself was a most delicate operation. And as it was soon to become a matter of more than frequent occurrence, space here can well be spared to outline briefly the methods adopted in launching seaplanes from battleships. It was an American naval invention, and was first described in the *Scientific American* as follows:

"The seaplane as a naval scout should be able to operate from a moving ship as a base, and to do this with much the same indifference to the state of the weather as its fellow in the military service, starting aloft from the ground. Otherwise its nautical usefulness would in no way be comparable with that so splendidly discharged by aircraft in the army. The stumbling block has been very largely the seaplane's inability to get a start from rough waters. The sturdiest of them are able to land upon something of a troubled sea, but their pon-

toons do not permit them to gain sufficient speed under those circumstances to ensure the take-off for a flight. Therefore, even though they might be put overboard safely in the lee of a ship, it has not been possible, except under the most favourable conditions of the water, to get them away in flight.

"But this difficulty has been surmounted here, thanks to the initial work of Captain Washington I. Chambers, U.S.N., who gave us the idea of a catapult launching apparatus for naval aircraft. As a practical naval man, this officer realised that no fighting ship could afford to be encumbered with long launching platforms such as were tried first here and then experimented with abroad. He knew that space must be economised and the sweep of guns uninterrupted. Therefore he conceived a short-run catapulting railway that could be quickly erected and just as rapidly dismantled and stored away. His first apparatus was tested over three years ago at the Washington Navy Yard, and as an outcome of those promising experiments a new machine was designed and sent to the Aeronautic Station, Pensacola, Florida.

"There it was installed at the start upon a coal barge and thoroughly tried out. As a result of its success the apparatus was removed and placed permanently aboard the U.S.S. *North Carolina*. It is from this ship that seaplanes have repeatedly been launched in the past few weeks in the open sea and with the armoured cruiser under way. Despite the fact that one of the older and heaviest of the service aeroplanes has been used in these trials, still the catapult has answered admirably and has taken care of the load imposed upon it again and again. This point is suggestive, because the weight factor may be taken to represent either a long-range scout or a lighter seaplane equipped with bomb-dropping apparatus.

"In principle, the launching device consists fundamentally of a car propelled along a narrow-gauge track. Upon this car rests the seaplane, and the aircraft is secured to the vehicle until the latter reaches the end of the runway. When the car stops the seaplane is automatically released, and the acquired inertia suffices to sustain the flying machine until its propellers are able to provide the necessary propulsive efforts."

The British seaplanes set out in much the same manner,

from the decks of the still, grey line of cruisers, that April morning of 1916, to bomb the Zeppelin sheds of Tondern. Sub-Lieutenant Hay flew alone in a single-seater; with Midshipman Hablyn as observer, Flight Sub-Lieutenant Knight was in charge of another and a larger machine; while Flight Lieutenant Reid, the gallant leader of the raid, and Chief Petty Officer Mullins were, respectively, pilot and observer of a third.

In the Chill Dawn

It was a dawn to daunt the bravest heart. One, at least, perhaps more of those daring young men, as they swam up into the sea of grey mist and drifting streamers of white cloud, which but barely shrouded the threatening promise of snow and sleet of the glowering horizon, must have experienced some or other fatal misgiving—must have known that flaunted Nature would demand—and extract—her price.

A cutting icy wind from the north-east bit into and beneath the stout comfort of leather flying-coats, and left pilots and observers numbed and shivering in their cramped seats. Beneath, the sea raced on incessantly, ominously a-gallop with storm-white, crested riders; kicking, spluttering, and tossing to the narrow horizon. But it was the rolling banks of mist and cloud that most struck terror to their hearts. Driving on, buffeted by the fierce wind, like mad Phæthon urging on his chariot, one moment they found themselves lost in oblivion, out of sight of sea, and sky, and fellow craft alike; the next, faintly discernible through the mist, the Schleswig-Holstein coast was silhouetted against the low horizon, a ragged, indistinct line of mottled black.

The ill wind, however, carried them on to some purpose behind and above the clouds; until, suddenly, they found themselves hovering over the great airship sheds of Tondern. After this the story differs little in essential details from many another equally daring raid in the war. It was afterwards that history was made—as the British craft winged hopelessly out to sea in vain search of the mother-ships.

Sub-Lieutenant Hay's machine, out of control, plunged down into the sea, precipitating him into the angry waters.

Reid, who had barely passed beyond range of the German gun-fire, saw the mishap, and, without hesitation, swept down to his rescue. It was sheer, cold-blooded, uncontrived heroism. Still under heavy fire, drenched and blinded by the raging salt spray, C.P.O. Mullins and he managed to haul Hay aboard their machine—too late!

The brave aviator who had led the raid upon the airship sheds, and who had thus risked his life to save a comrade, found himself at the mercy of the enemy. He made valiant efforts to get his machine away, but it refused to leave the rough waters. While an enemy seaplane slowly ploughed its way toward the stricken British craft, Reid exerted his utmost skill in a last attempt to get away, but found himself beaten by the weather and the water. He was forced to surrender.

CHAPTER IX

THE LAST OF THE ZEPPELINS

Wonderful German Lies—The *King Stephen* and L19—Weather and the Zeppelins—The Beginnings of Disaster—The German Book, "Zeppelins over England"—The Mythical Merchant from Norway—A Laugh from France—Leefe Robinson's Great Feat.

THE noteworthy feature of 1916 was the final defeat of the Zeppelin campaign. Owing to the loss of innumerable craft brought down in the autumn of this year by the watchful British patrol vessels in the North Sea, the no less alert anti-aircraft gunners ashore, who daily were growing more and more accurate with their firing, and the daring onslaughts of British airmen in mid-air, the enemy Zeppelin campaign was definitely abandoned in the spring of 1917. Of the latter feats, that of Lieutenant Leefe Robinson, who brought down the L21 at Cuffley, September 3, 1916, will never be forgotten. While the manner in which the German High Command this year faked their accounts of the damage achieved by their raiding aircraft soon waxed palpable to the whole world.

The first raid of the year took place late on the evening of January 31. Six or seven Zeppelins attempted an attack on an extensive scale, but were hampered by the thick mist. After crossing the East Coast the Zeppelins steered various courses, and dropped bombs on several towns, and in rural districts in Derbyshire, Leicestershire, Lincolnshire, and Staffordshire. Very little damage was achieved. For this "heroic act" the commander of the raiding airship fleet was decorated with the Order Pour le Mérite by the Kaiser in person, the other officers and men receiving the Iron Cross of the first and second class. And a most exaggerated account of the affair was circulated throughout Germany by the Government.

According to this account "factories were hit near Liverpool, also Birkenhead iron foundries and smelting furnaces, Man-

chester factories, smelting furnaces at Nottingham and Sheffield, and the great industrial works on the Humber and near Great Yarmouth." A comparison between these two accounts furnishes its own reply. Nearly a month elapsed before the enemy supplemented this account with the following summary, which is stated to have originated from authoritative quarters:

"1.—LIVERPOOL

"The main objects of the attack were the docks and the port and factory areas. The effect of the bombs was good: during the return voyage of the airships an enormous fire was still visible at a great distance. A number of bridges and harbour areas were so severely damaged that it is for the present no longer possible to use them. It is said that a number of ships in the Mersey were badly damaged—among others a cruiser lying below Birkenhead and a transport ship of the Leyland Line. Stables containing 200 horses were destroyed by fire, and it is said that the horses and the Canadian troops guarding them were killed. Great damage was done at Birkenhead, Garston and Bootle. The Booth Line and Yeoward Line have been severely injured by the partial destruction of their docks. Three ships suffered great injury. The neighbouring dry docks and engine works, as well as the 'Birkenhead Dry Dock, Engine and Boiler Works,' were completely destroyed. In all, more than 200 houses were destroyed by bombs or fire. At the mouth of the Mersey (in Bootle) a powder factory was completely destroyed. At Crewe, south-east of Liverpool, the railways were greatly damaged, so that traffic with London was interrupted. At this point military encampments also are said to have been set on fire.

"2.—MANCHESTER

"The objects of attack were mainly foundries, which were sprinkled with bombs with good success. Two foundries and two large ironworks were completely destroyed. A number of other factories suffered considerable damage.

"3.—SHEFFIELD

"In the south of the town two foundries were bombed, and one of them was in great part destroyed. Several large indus-

trial areas and the railways were bombed, and it is said that two sheds which served military purposes were destroyed. Large fires were observed for a long time after the attack.

"4.—NOTTINGHAM

"Attacks were made on large factory areas and foundries, and very good effects were observed. A battery which had fired without effect upon our airships was reduced to silence. A munition factory and several factory areas were badly damaged. At Grantham, east of Nottingham, the railways were destroyed, so that traffic had to be stopped for several days. By far the greatest amount of damage was done at Sheffield and Nottingham; London insurance societies estimate it at £400,000.

"5.—BIRMINGHAM

"Two large Government works and two munition factories were completely destroyed, and a brewery was damaged. Great damage was done generally in Staffordshire, Shropshire, Cheshire, Leicestershire, Lincolnshire, and Yorkshire. At Eccleshill, near Bradford, a munition factory and three spinning works were destroyed, and at Partington twenty-two houses were destroyed by one bomb.

"6.—HUMBER

"A battery which fired without effect upon our airships was attacked and reduced to silence. Guns and searchlights belonging to the battery were destroyed. Bombs were thrown upon a number of industrial areas on the Humber and on a large foundry, good success being observed everywhere. At Grimsby the shipbuilding yards and warehouses, as well as several cargo and fishing vessels, were severely damaged. A hay and straw warehouse was burned down, considerable damage being thus done. Between Hedon and Salt Enden (below Hull) a powder magazine was destroyed. Near Hull a smelting works was badly damaged. In Hull itself the devastation is said to have been very great, and to have almost equalled that in Sheffield and Nottingham. A block of houses in King Street was entirely destroyed. The railway and port areas suffered so much that there is great difficulty in carrying

on work. Several trading ships lying in the docks are said to have been damaged. Above Goole a foundry was badly damaged. In the Humber a small cruiser, *Caroline*, and the destroyers *Eden* and *Nith* were sunk. The small cruiser *Caroline* went down in six minutes, 31 men of the crew were killed, 58 wounded, and 47 drowned.

"7.—Great Yarmouth

"A factory and various industrial areas were bombed, good effects being observed, and on the English east coast yet another battery was silenced, and the English steamer *Franz Fischer* was sunk by one of the airships."

Not content with this literary effort, for almost every similar raid which occurred up to June an equally exaggerated account was furnished. A wireless message from Berlin, on February 10, also reported that, beside the British cruiser *Caroline*, the two destroyers *Eden* and *Nith* were also sunk in the Humber. The Admiralty denied this report, as they were all denied, immediately. But it was a more than difficult matter to deny damage on positions, which only existed in the enemy imagination, and were only created to amplify his fantastic reports.

There was, for example, the factories at Deal, which were attacked on February 21. A raid on the naval *point d'appui*, whatever that may have been, of Hull-upon-Humber followed on March 6. Bombs were freely dropped during the night of March 31-April 1, according to the same authority, on the City between Tower Bridge and London docks, the military camps in the north-western district of the City, the manufactories near Enfield—and it is a feasible report. When it comes, however, to the munition works at "Wath Abbey," and the extensive manufacturing works of the town, that is altogether another matter.

On yet another occasion, April 26, according to the Chief of Army Administration: "During the night German military airships attacked the English fortified ports and establishments of Colchester, Blackwater and Ramsgate (*sic*). This is amazing enough, but a summary of the Zeppelin operations between March 31 and April 6 is little short of ludicrous. In London on the occasion of the March 31 raid, for instance,

the Germans would have us believe that a large factory near Liverpool Street Station was burnt down, and several bombs fell on a transport steamer near London Bridge, causing it to sink. According to the same summary, at Grimsby, a fortnight later, widespread destruction was caused. "The gasworks, the electric light works, and the suburban railway station suffered seriously. Outside Grimsby one munition factory was destroyed and another severely damaged" (!) In Edinburgh and Leith, too, this summary states, "the damage was very great. Barracks, munitions depots, ironworks, and other factories lie in ruins"(!) Two munition works broke out in flames and were destroyed. The large spirit factory (?) was hit by incendiary bombs and was burned to the ground. The railway station was also materially damaged. A train with material was destroyed. In the port several ships were hit; one English four-masted ship was almost completely destroyed, and a transport steamer with war material was so badly damaged that it could not start on its voyage.

Zeppelin Propaganda in the United States

There is imagination, plenty of it, in this summary, but a great lack of veracity. To the United Press of America this same statement was forwarded before it reached Great Britain. It was, if anything, further amplified in the States, in that, judging from the Zeppelin observations, the Germans declared that the attack on Liverpool accomplished its object, which was to destroy the grain elevators. It was officially stated, according to this humorous announcement, that England received most of her grain from foreign countries through Liverpool, and that there were also great mills there, so that practically all English supplies had to go through Liverpool. This raid, it was pointed out in conclusion, must not be considered as a reprisal for the famous Baralong incident. At the same time, the German Embassy in Washington, commenting on the Zeppelin squadron attack on England, issued to the German papers in America the following: "The British will, of course, clamour against the barbarous German attack upon open towns, and the assassination of women and children if such happen to be victims of this *important military* action."

It was officially announced by the Press Bureau that no single detail in this enemy summary was correct. "The papers point out that Birkenhead, which is the chief place for the construction of warships, is the principal entrance to the harbour of Liverpool, and a depot for American ammunition, at the mouth of the Mersey, and is also a fortress; while Manchester contains sheds of cotton, which, according to the British, is contraband. Nottingham manufactures ammunition and barbed wire, and Sheffield makes cannon and ammunitions, while Great Yarmouth contains a great number of small craft, armed and destined for the chase of submarines."

It must be obvious to all, by this time, the reason for this bombastic and lying enemy campaign. Where Britain had upset all the German plans by unexpectedly coming into the war, the intense German hatred of ourselves waxed stronger and was greatly inflamed, as, on land, French's "Contemptibles" held up the flower of the German Army. And slowly but surely the British Navy at sea was getting a stranglehold on the German internal and economic situations. The inaccessible geographical position of these islands, if anything, brought home to the enemy the fact that, unless some entirely unforeseen contingency occurred, it was impossible to invade English shores from the waters of the North Sea. The Zeppelins, on the other hand, in the air had proved far from successful. Public opinion had to be bolstered up. The continued failure of the giant airships had to be explained. And in this respect—the Zeppelin campaign—it must be admitted that the enemy did not meet with the best of luck.

There occurred, for instance, in February, 1916, the famous encounter of the Grimsby fishing trawler *King Stephen* and the Zeppelin L19 far out across the North Sea. The facts of this encounter were given in an official *communiqué* issued by the German Admiralty on February 4:

"The naval airship L19 did not return from a reconnoitring cruise. All investigations have proved fruitless. According to a Reuter telegram the Grimsby trawler *King Stephen* sighted on the 2nd inst. an airship floating in the North Sea, with her cars and the gasbag partly submerged. The crew were on the upper part of the balloon. Their request for rescue

was refused by the English trawler under the pretext that her crew was weaker than that of the airship. The trawler returned to Grimsby."

The L19 in the North Sea

The captain of a French vessel first brought the news into Hull of having seen a Zeppelin destroyed in the North Sea on the morning of the 2nd inst. Two naval vessels, which were dispatched immediately, however, failed to find any trace of the fallen airship. According to the first mate of the *King Stephen* attention was first attracted by a flashing light, and after getting in the gear the trawler was steered in that direction. It was then daylight, and eight men were seen on the top platform. The greater part of the airship was under water, and about fifty feet of the fore part of the envelope was above water.

Subsequently about twenty men were seen, and others were apparently at work trying to repair the airship, as the sound of hammers was heard. As the crew of the trawler only numbered nine, and they were unarmed, the skipper decided that it would be too risky to take the Germans on board, and as it appeared that the airship would probably keep afloat for some time, he made for the nearest point to report to the British naval authorities. The L19 shortly afterwards foundered in a gale.

On the whole, the Germans, if anything, were favoured in the weather during which their Zeppelin raids occurred. An analysis of weather conditions which prevailed during Zeppelin raids between January 19, 1915, and March 5, 1916, gives the reader a very fair idea of the limitations of the giant airship as an offensive vessel of war.

As raid succeeded raid—there were no less than twenty-four such visits paid Great Britain during the year—it becomes more and more apparent that, to all intents and purposes, the Zeppelin campaign was ended. The attempt on the night of March 31, with the possible exception of the September 23-24 and 25-27 raids, which both ended so disastrously for the enemy, may be said to have been the last enemy Zeppelin raid on a large scale that was successful. Five Zeppelins on that occasion crossed the coast at various places and times. Ninety

A TABLE OF WEATHER CONDITIONS

Date of Raid	*Place*	*Temp. Fahr.*	*Wind direction*	*Velocity of wind miles per hour*
1915				
Jan. 19	Yarmouth, Sheringham, King's Lynn	41	Light air, S.W.	1 to 3
Apr. 14	Tyneside	45	Slight breeze, S.E.	4 to 7
,, 15	Lowestoft East Coast	52	Slight breeze, S.W.	4 to 7
,, 29	Ipswich Bury St. Edmunds	47	Slight breeze, N.E.	4 to 7
May 10	Southend	52	Strong Breeze, N.N.E.	25 to 31
,, 16	Ramsgate	55	Light air, S.S.W.	1 to 4
,, 27	Southend	48	Strong breeze, N.	23 to 31
,, 31	Outer London	61	Light air, N.	1 to 3
June 4	East and South-East Coast	56	Slight breeze, S.E.	4 to 7
,, 6	East Coast	55	Moderate breeze, S.E.	13 to 18
,, 15	North-East Coast	56	Slight breeze, N.E.	4 to 7
Aug. 9	East Coast	63	Light air, E.	1 to 3
,, 12	East Coast	58	Light air, N.	1 to 3
,, 17	Eastern Counties	61	Slight breeze, N.E.	4 to 7
Sept. 7	Eastern Counties	62	Light breeze, S.S.W.	1 to 3
,, 8	Eastern Counties and London	67	Slight breeze, E.S.E.	4 to 7
,, 11	East Coast	61	Mod. breeze, E.S.E.	13 to 18
,, 12	East Coast	61	Gentle breeze, S.	8 to 12
Oct. 13	London and Eastern Counties	56	Light air, S.E.	1 to 3
1916				
Jan. 13	Norfolk, Suffolk, Lincs., Leicestershire, Derbyshire, Staffordshire	41	Light air, S.S.W.	1 to 3
Mar. 5	Yorkshire, Lincs., Rutland, Huntingdonshire, Cambridgeshire, Norfolk, Essex, Kent	34	Moderate breeze, N.	13 to 18

The Last of the Zeppelins

BETWEEN JANUARY 19, 1915, AND MARCH 5, 1916.

Date of Raid	*Weather*	*State of Moon*
1915		
Jan. 19	Overcast sky; rain, mist	Four days after new moon
Apr. 14	Overcast sky; mist	New moon
,, 15	Sky three parts clouded	One day after new moon
,, 29	Blue sky; rain	Full moon
May 10	Blue sky	Four days before new moon
,, 16	Blue sky	Two days after new moon
,, 27	Overcast sky	Three days before full moon
,, 31	Blue sky	Three days after full moon
June 4	Clouded sky; mist	Last quarter
,, 6	Blue sky	Two days after last quarter
,, 15	Sky half clouded	Three days after new moon
Aug. 9	Overcast sky; mist, rain	Two days after new moon
,, 12	Overcast sky; mist, rain	Two days after new moon
,, 17	Sky three parts clouded	One day before first quarte
Sept. 7	Sky half clouded	Two days after new moon
,, 8	Sky three parts clouded	One day before new moon
,, 11	Blue sky	Two days after new moon
,, 12	Blue sky	Three days after new moon
Oct. 13	Blue sky	Two days before first quarter
1916		
Jan. 13	Fog	Three days after last quarter
Mar. 5	Half clouded; snow squalls	One day after new moon

bombs were dropped in various localities in the Eastern Counties, which two squadrons made their objective, while a detached ship raided the north-east coast. One airship, the L15, was reported by the Admiralty to have fallen into the sea. She was hit by gunfire while over the Eastern Counties, the shell striking the upper part of the ship near the tail. After being hit she quickly dropped to a lower altitude, well down by the tail, and finally came down into the sea off the coast of Kent. A machine gun, some ammunition, a petrol tank riddled with shrapnel, and some machinery were dropped either by this vessel or by another of the raiders.

It was the first of many Zeppelin losses, which, to their great chagrin, the Germans had to admit during the next few weeks. On March 19 a Zeppelin raid on England, in which no less than six great airships participated, was ignominiously beaten off by anti-aircraft fire. Over a hundred bombs of heavy calibre which were dropped during the raid of April 24 accounted for one dead horse, the destruction of a haystack, and a quantity of broken glass. Though Zeppelins were reported over the east coast of Kent between 10.30 and 11 P.M. on the night of April 26-27 again they were driven off by anti-aircraft fire, and turned back before midnight. On May 2, though six airships operated over a considerable extent of our eastern coast—some so far distant as Rattray Head, in Scotland, down to the north coast of Norfolk—and over 100 bombs were dropped, only in a single locality did the raiders effect much damage and cause any casualties: 9 killed and 27 injured. And in two different communiqués the Germans admitted, on May 6: "The airship L7 has not returned from a reconnoitring flight," and "One of our airships did not return from a trip to Salonica."

Indeed, a sad chapter in the history of the Zeppelin it was that immediately preceded and followed this grudging announcement. From the poignant, tragic last message from Commander Lowes, of L19: "With fifteen men on the platform and no gondola. L19 is sinking very slowly. I am unable to save the airship. In foggy weather we, on our return from England, passed Holland and were bombarded by Dutch sentinels. At the same moment three motors failed.—1 P.M."

Picked up in a bottle, which also contained fifteen letters from the crew of the L19 to their relatives, by the fishermen at Marstrand, the catastrophe develops with the loss of the L7 at sea, and with the destruction of Z85 and the wreck of the L20 it reaches almost a climax.

The End of L7

The Commander-in-Chief of the Grand Fleet, on May 5, reported that H.M.S. *Galatea* and H.M.S. *Phaeton*, operating in one of our light cruiser squadrons off the Schleswig coast, had destroyed an enemy Zeppelin. As was ultimately disclosed, the airship was the L7, which was apparently engaged on scouting duty at the time of the encounter. Though severely damaged by the guns of the *Galatea* and *Phaeton*, her destruction was completed by a British submarine commanded by Lieut.-Commander Feilman, which rescued seven of the Zeppelin's crew, and returned with them. On her homeward way the British submarine was attacked unsuccessfully by a German cruiser.

"There were no survivors" was first officially reported of the destruction of Z85 (May 5) at Salonica. But this statement was afterwards amended by Vice-Admiral de Robeck to "Survivors of the crew have been found, and four officers and eight men have been made prisoners."

It would appear by all accounts that at 2.30 in the morning of the 5th inst. the Z85 approached Salonica. When passing over the harbour she was heavily fired on and hit—once in a tank, once in a ballonet, and once near the stern—by the guns of the Allied fleet, and came down in a blaze near the mouth of the Vardar River. The Z85 was built at the latter end of 1915. She was 560 feet long and had four 100-h.p. engines. Her speed was 60 miles an hour. The tanks held 2,500 litres of petrol. She recently had been engaged in bombing Riga, Minsk, and Dvinsk, and attempted at the end of February and in the middle of March to approach Salonica, but was driven off near the frontier.

The destruction of the L20 was most graphically described by a *Daily Mail* correspondent at Stavanger as follows:—

"The Zeppelin L20, wrecked on the shore of the Halsfiord,

four miles from Stavanger, at noon to-day, was first reported flying low at a slow rate across the Gannsfiord, between Dale and Hinna. The hull was then apparently still in proper order, but probably gas had been escaping. The weather was quiet and the sea calm. When above the Gannsfiord the Zeppelin dropped an anchor and also six men, who are all reported to have been rescued and taken in charge by soldiers.

"The Zeppelin then drifted towards Halsfiord; but, not having been sufficiently lightened, collided with a low-lying rock, and turned a somersault sideways. She seemed to double up something less than a right angle, and slowly fell into the fiord. Then she drifted across the water to Jaasund, and she now lies ashore like a vessel hauled up on a slip for repairs.

"Captain-Lieutenant Stabberf, the commander, stated that he left Germany at midday on Tuesday and journeyed to the coast of England. On Tuesday night he prepared to return, but very stormy weather forced him off his course many times. On Wednesday morning his petrol had nearly given out. Only about ten pints remained when he sighted the Norwegian coast and decided to descend."

The time, meanwhile, is rapidly drawing on to that most tragic day in Zeppelin history, September 3, 1916. Still the enemy, flushed with his early successes, continues his raids every favourable night without cessation; still he booms and advertises their achievements to a by now sceptical world of neutrals. Belief dies hard! Gradually, very gradually, the sting is removed from the giant airship raider: it can be traced with each successive raid.

To the enemy claim of their raid on the night of July 28-29, on the "railway depot at Lincoln," on which many bombs were dropped, industrial establishments near Norwich, the naval bases of Grimsby and Immingham, and on the auxiliary vessels off the Humber (*sic*), the British War Office replied laconically enough: "Four small houses wrecked; one shop demolished; three dwelling-houses and three shops damaged by explosion or [illegible]; a number of small houses and cottages slightly damaged, either by fragments of bombs or by concussion which shattered windows; fifty feet of colliery railway line torn up; one horse killed." And to the later German claim

that the lighthouse at the mouth of the Humber was destroyed, the reply is: "The German report of the air raid on the night of July 28-29 is full of the usual inaccuracies."

It is the same with each successive raid: the enemy exaggeration and the inevitable British denial. On the night of July 21 the Germans, in their attack on London and the East Coast, claim to have dropped numerous bombs on the coast works, anti-aircraft batteries, and industrial establishments, which were important from a military point of view. In truth, "bombs were dropped somewhat indiscriminately over localities possessing no military importance." No single casualty and no damage were reported by the War Office of the raid of August 23. Of that on the 24th-25th, when six hostile airships raided the east and south-east coasts at intervals between midnight and 3 A.M., the report was that the casualties totalled 8 killed, 7 seriously injured, and 14 slightly injured.

"Zeppelins over England"

Again, with a last final effort at propaganda on the part of the German Government, which immediately precedes the climax and immediate defeat of the Zeppelin effort, the book, "Zeppelins Over England," is launched on the gullible public by the proprietors of the *Vossische Zeitung*. It is copiously illustrated with ghost-like pictures of blazing and devastated English towns, factories, harbours, and ships. "The book," says a correspondent of the *Daily Chronicle*, who reviewed it at considerable length at the time, "apparently collects all the awful tales of calamity in all their absurdity with which the German public have been regaled for the past twelve months. These we need not repeat. But there are new features as well, newer and spicier details of terrible destruction served up, from which a few extracts may be given. We note the glee with which the author does his work, the gloating over horrors, his howls of fiendish joy. Doubtless he knows his public.

"The author supposes himself in a Zeppelin, which has already reached the English coast, and has been appointed to operate between Yarmouth and Norwich. The Great Central Railway unites these two towns. The trains on this line travel relatively slowly, but on this night their pace was accelerated.

It was 'flight, flight.' But above in the air there was something moving still more rapidly.' Bursting bombs hailed on the railway stations, destroying, tearing. The metals rolled up like thin wire. A searchlight is turned on the Zeppelin. A bomb extinguishes it, and batteries which have fired in the light of the searchlight were silenced for ever.

"The destruction goes its way along the line, which is torn up beyond recognition. A train approaches at racing speed. With thunderous crashing, which is heard above the droning of the air-screws, the locomotive pitches into the ruins, turns over, the train burns. British troops will not be transported on that line for some time to come. The German Death swings his scythe, and prepares himself for new blows. This is war —war which you would have. The starved, ruined Germany approaches you.

"In Lincolnshire," proceeds our liar, "railway stations, great stores, barracks were attended to. Bombs struck a remount depot. Many hundreds of horses were killed, torn to pieces. There must be no pity for horses. It is another blow for the British front. Do the British tacticians require horses to storm the trenches? One less trouble for our comrades on the Somme.

"Another Zeppelin is approaching the coast. 'Forward, yonder is England!' There is a ship below. Its three slender smoke-stacks are visible. On this ship fell the first iron greeting. Badly injured, the stricken ship runs to the coast and is stranded. One ship less. At the end of Spurn Head the lighthouse flames out. Crash down on it went a bomb, and the proud edifice toppled over and fell with loud tumult across the mole. One mark less to steer by! And the loss is all the more keenly felt because of the difficulty of navigating the river up to Hull. The English Admiralty, of course, denies everything, as usual. Lighthouse? Nothing of the kind. That was a lame mule and a young, innocent child that the bomb fell on.

"Much savage gloating over Grimsby, which is alleged to have suffered terribly. Here in Grimsby are the most dangerous enemies of our U-boats—the fishermen, mine-sweepers, and the patrol boatmen who sniff out the submarines. Great execu-

tion was done among oil-tanks, on which incendiary bombs were dropped. We get the words of command which the commanders of the Zeppelins call out to their crews:

"'Incendiary bombs!'

"'Quick fire!'

"And then columns of dense smoke and forked flame shoot up to the heavens. Munition factories burst in a million fragments. Their value is millions of pounds. 'Incendiary bombs!' And in eight or ten places fire—a monstrous fire, lurid in the night. The place is bright as day. Panic! There underneath they are running wildly about, seeking to save themselves, seeking shelter. Close by is the railway station. One train after another streams out of the station, and a congested mass of people storms the building, seeking flight. Hundreds, thousands!

"Looking at the dense masses tightly squeezed together, a horrible recollection dawns on the Zeppelin commander. The Zeppelin hovers over the station. Not very long ago, in Karlsruhe, there was a joyful festal multitude in the streets. The enemy bombs crashed down on innocent people, shattering, tearing, killing. Hundreds of children wallowed in their blood. Remember Karlsruhe! No; we are Germans, we are Huns, barbarians! We do not fight against children. And the commandant left the word of command unspoken.

"After their night of terror, in which the entire eastern coast had burst into flames, the order was given, 'Homewards!' A fiery monster sprang up to the sky, almost licking the clouds. It was their last bomb. The air seems to rotate; a current seizes the Zeppelin, shakes the gondolas, beats on the hull. The gigantic torch of fire is our signpost, and illuminates the great grey Zeppelin, which soars ever higher and higher, unapproachable as it stands out to sea."

It is a simple matter enough, indeed, then, to diagnose the feelings of the German public with regard to their Zeppelins at the time; but what cannot be realised is the utter humiliation they must have experienced on September 3, the day after the night on which Lieutenant Leefe Robinson, V.C.—the first aeroplane pilot so to do—brought down a Zeppelin in flames at Cuffley. From that very night may be said to date the ulti-

mate defeat of the Zeppelin campaign. And the crusade of the apostles of frightfulness becomes daily a more thankless and dangerous task.

"It is against England," says the King of Würtemberg, at Stuttgart, "that our principal efforts must be directed. Every Zeppelin that drops destruction on London is an instrument of righteousness. England must be attacked more and more from the air, since our glorious armies, which annihilate all other enemies, cannot reach the shores of our most dangerous foe."

The day following the speech is published the most lying fabrication yet. Intended to enumerate the damage and destruction achieved by the Zeppelin raids of July 28-29, July 31, and August 1, and August 2-3, this dossier indulges in the most impossible claims. "The damage caused in Hull amounts to millions. A panic broke out amongst the population when they realised that the anti-aircraft guns could do nothing against the airships. In Harwich an airship shed in course of construction was brought down. In an eastern suburb of London a cotton mill used for the manufacture of shell cases was completely destroyed. Over a thousand men and women have been put out of employment. Several large bridges across the Thames, including the footbridges of the Tower Bridge, were damaged. In the docks several warehouses and landing piers were destroyed. Ships anchored there were partly seriously damaged. In one dock numerous ships, including a large English steamer, which were supposed to take provisions to France to the troops, were destroyed by fire; and in the Thames a torpedo-boat was hit by German bombs and sank!"

During the raid of the night of August 24-25, again it is claimed that the batteries at the naval stations of Harwich and Folkestone (!), and numerous vessels moored in Dover Harbour, were hit by German bombs. As an effort of imagination, however, the scheme of propaganda achieves genius with the supposed interview with a Norwegian merchant. This gentleman has just returned to Christiania from London, where he says he spent the night shivering in the company of the King, the Queen, and the Duke of Connaught, who had just arrived at St. Pancras, but could not get to Buckingham Palace because the streets were torn up by Zeppelin bombs. The

merchant adds that the King remained for an hour and a half in the cellar, only speaking three words. He adds that London is a maze of underground bars, business offices, shops, and theatres, all advertising themselves safe from Zeppelins, and that practically every house in London is an ammunition factory!

The "Zepps" and "Anti-Zepps"

There can be little doubt—in fact it is almost a war of factions by now in Germany between the strong and the extreme Zeppelin party—of the deep-rooted hold which the giant airship campaign has gained on the hearts of the populace. Where one party shudders, not so much at the thought of the merciless slaughter of women and children, as a craven horror of possible reprisals, the other is willing and eager to charge on to the last ditch, headed by that hoary iconoclast, Zeppelin himself. Dated September 5, in reply to a base rumour that the Zeppelin campaign is to be abandoned—the altogether disastrous affair at Cuffley has taken place in the interval—and that the old man has hindered the Main Headquarters' plan of ruthless Zeppelin warfare upon England, his reply is characteristic and of no undecided tone. "I am informed," he writes to the Imperial Chancellor, and is quoted by the *Norddeutsche Allgemeine Zeitung*, "that in the course of the agitation carried on by your Excellency's enemies it is continually asserted that I have stated it to be my view that from consideration for England or from a desire not to render an understanding with England difficult, and thus from some political motive, the greatest possible effective and ruthless use of Zeppelins is not being made.

"I am convinced that the employment of Zeppelins is in no wise hindered by any political or other considerations. I need not tell your Excellency that I am in no wise a party to this misuse of my name. I sincerely deplore it, and I leave it to your Excellency to make any use you desire of this explanation."

For this outspoken explanation there are at this time excellent politic reasons. The damage to and loss of craft, and the failure to attain objectives on the part of the Zeppelin commanders, in no way compensates public opinion for the ever-

growing burden of the upkeep of the giant airship fleet on the war exchequer. A second list of German Army airship losses, published early in September, gives (in addition to the one including the name of Captain Schramm) 17 names, 16 registered as missing and 1 died of sickness. This list includes 1 infantry captain, 2 lieutenants, 10 engineers, 2 helmsmen, 1 N.C.O., and 1 private. Basing all observations on the principle that Germany entered the war as a purely business proposition, the following facts may be put on the debit side of the balance-sheet of the expenses of the Zeppelin campaign, as the cost of an average raid on Great Britain :

£1,200 for petrol.
£600 for oil.
£1,000 for bombs.
£3,000 for refits and repairs.
£250 for Wolff telegrams.
£60,000 for the loss of one Zeppelin.
£10,000 for pensions; and
£10 for Iron Crosses; total, £76,060.

With characteristic humour, M. Louis Forest, in the *Matin* about this time, deals with the other side of the account—crediting two British lives lost, and, assuming that he is Hindenburg making out a report to the Kaiser, proceeds :

"Your Majesty will readily perceive that this expedition gives us something substantial to go upon for the solution of the problem before us, and which alone can gloriously terminate the war, namely, the destruction of England. The loss of two Englishmen having cost us close upon £80,000, a simple calculation suffices to show, taking the population of Great Britain in round figures at 46,000,000 of souls, that in order to kill off the lot we shall not be obliged to spend more than £1,840,000,000,000. I venture to think that there will be no difficulty in obtaining this sum from the Minister of Finance, especially when it is considered how reasonable it is compared with the results it will achieve.

"The money part of the problem settled, there only remains one small point to be got over. The destruction of two Englishmen having cost us the lives of twenty Germans, a superficial mind might imagine that we ourselves shall be wiped out before

we have encompassed the death of every inhabitant of Great Britain. Seeing, however, that the permanent Committee of German Professors established to deal with the problems of the war has always been able to demonstrate that what must be done for the pursuance of German aims can always be accomplished, I do not doubt for a moment but that the same Committee will discover a formula proving that this particular point is only an apparent difficulty, and not of a nature that need for a moment trouble or thwart our activity.—HINDENBURG."

"The Usual Misstatements"

Hindenburg, in fact, must have spent considerable time and showed no less tact in making palatable to the German public the Zeppelin disaster at Cuffley, September 3, and the double disaster at Potter's Bar, September 23. On September 25, for instance, the enemy claimed that several German naval airships dropped bombs on London and places of military importance on the Humber, and in the Midland Counties, including Nottingham and Sheffield. The result was everywhere observed by big fires, according to this same account, which could be seen for a long time. On their way, before crossing the British coast, the airships were taken under fire by guard vessels, and during the attack itself under extraordinarily heavy fire with incendiary shells by numerous anti-aircraft batteries. They silenced some batteries by well-directed volleys. To which well-considered statement, the Press Bureau, mercilessly enough, retorted: "It is officially stated that, in addition to the fact that no anti-aircraft defences or places of military importance were damaged, the account is full of the usual misstatements." But what a bitter pill it must have been for Germany's latest idol to add the following significant phrase: "Two airships fell victims to the enemy anti-aircraft defences of London."

"He attacked an enemy airship under circumstances of great difficulty and danger, and sent it crashing to the ground, a flaming wreck. He had been in the air for more than two hours, and had previously attacked another airship during his flight." Most significant phrase of any yet published is this extract from the official announcement of the award of the

V.C. to Lieut. Leefe Robinson. The first German Zeppelin to be brought down on British shores! It was the death-knell to enemy hopes. From that moment when Robinson brought the L21 flaming to earth at Cuffley, the German plan of a continuous airship invasion of "hated" England was at an end. The aeroplane, which previously had proved incapable of attacking a Zeppelin in mid-air, thenceforth was to prove the superior aircraft. On no future occasion did the enemy cross our aerial coasts without loss or without extreme danger to all concerned. And how was this revolution in aerial warfare accomplished? How actually in what manner did the aeroplane prove itself superior to the Zeppelin as an aircraft of war?

What was the magic that proved so potent?

It will be remembered that Lieut. Robinson brought down the L21 by attacking it from above. A longer and more detailed account of this splendid exploit is furnished by a fellow airman of the R.F.C., who was in the air at the same time, and actually engaged in attacking the same ship, the L21. At the time he was piloting a high-power biplane, and had reached an altitude of nearly 10,000 feet before he was able to engage the raider. "Two other aeroplanes," says this witness, "were endeavouring to engage the airship, which was making frantic efforts to get away, at the same time firing with machine-guns. The Zeppelin was travelling at top speed, first diving and then ascending, and apparently Lieut. W. L. Robinson, who was the officer piloting the biplane which had first attacked the raider, anticipated the manœuvre."

Robinson's Zeppelin

The raid, which was carried out by thirteen airships, was the most formidable which had yet been made on this country. The principal theatre of operations was the Eastern Counties, and the objectives seem to have been London and industrial centres in the Midlands. The new measures taken by the authorities for the reduction or obscuration of lights proved most efficacious, for the raiding squadrons, instead of steering a steady course as in the raids of the early spring, groped about in the darkness looking for a safe avenue of approach to their objectives. Three airships only were able to approach the out-

skirts of London. One of them appeared over the northern districts at about 2.15 A.M.

Instantly the searchlights roved the sky in scores. Not to the east, but to the west, a light flickered for a moment on a long bright body, and immediately there she was, ten thousand feet up, sailing due north, the centre of attraction for the whole outfit of lights.

In a moment the air was filled with the crash of guns, and shells screamed upwards towards their target. Slowly the airship turned on her course, turning her nose to the north-east, but drifted due north. She moved very slowly, "crabbing" all the while, and drifting with the wind.

This "crabbing" north lasted for five minutes, and then she appeared to get under power again and move her nose until she was steering almost due west, making back towards London, but some ten miles farther north. Guns were pounding at her incessantly, and the shells appeared to burst all over her; under and over and at both ends. Suddenly "something" happened, when every gun ceased firing as if by magic, and in the full blaze of the searchlights she sailed ahead. It was an ominous silence that seemed to tell of something *else* about to happen.

"The commander of the airship," the airman continues, "threw out tremendous black clouds of smoke, which completely hid him from our view, and in which he managed to rise. A few seconds later we saw the airship a couple of thousand feet above us, and at the same altitude was Lieut. Robinson, although a matter of perhaps half a mile away. Immediately Robinson headed his machine for the raider, and flying at a terrific speed, it appeared that he was going to charge the monster. I shall never forget the sight of the blazing airship as it fell. Away up above the clouds, 12,000 feet from the earth, the scene was terrifying in its grandeur. A huge sheet of flame cast a brilliant red glow over the black sky above, tinting to a vivid pink the clouds beneath.

"As the Zeppelin took fire a second airship was seen approaching, and this now occupied our attention. The commander of that craft, however, seeing the fate of the first Zeppelin, evidently considered that discretion was the better

part of valour, for he turned tail and scurried off as fast as his engines would enable him to travel. At such a height and in the darkness it was impossible to pick him up.

"He had a good start, and made the most of it. I am told that German aeroplanes accompanied the Zeppelins, but of this all I can say is I saw none on Sunday morning, although other officers claim to have done so."

The grim loss of the "L21" at Cuffley had struck a shuddering blow at the heart of Germany's pride and unnatural belief in her giant airships. For almost a fortnight following that disastrous September 3, the High Command hesitated, uncertain whether to abandon the Zeppelin campaign altogether or to renew it with greater ferocity. In the end, and after a fortnight of doubt and hesitation, German public opinion—a rare exception—forced the hands of the High Command. On the night of September 22 and 23 fifteen German Zeppelins crossed the East and South-Eastern coasts of Britain, two of which (the naval ships "L32" and "L33") were never to return. At the same time another attack was made on Lincolnshire; the latter locality being approached from the north-east and south-east about midnight, and was beaten off by the anti-aircraft defences.

The attack on London was carried out by two groups of Zeppelins; a single airship about midnight and two from the south-east between 1 and 2 a.m. Aeroplanes were sent up, and fire was opened from the anti-aircraft defences, the raiders being driven off. Bombs were dropped, however, in the south and south-eastern districts, and, unfortunately, twenty-eight persons were killed and ninety-nine injured. But an excellent antidote to this unparalleled slaughter was provided for in the fact that two Zeppelins had been brought down; one falling in flames and being destroyed together with the crew. The crew of twenty-two officers and men of the second were captured.

Both "L32" and the "L33" were brought down in Essex. Both were large airships of very recent construction. The first craft was finally destroyed by an aeroplane after passing through effective gunfire. The second airship was hit by gunfire from the London defences, and forced to descend through loss of gas.

Our airmen had been up after the Zeppelins many times before. What was it that suddenly gave them the mastery over

the giant gasbag—apart from their own gallantry, of course? The answer is somewhat surprising. It was, in fact, a piece of metal weighing about half an ounce! A new machine-gun bullet that contained an incendiary mixture that was capable of setting fire to the gas in the airship. For months half a dozen officers at Woolwich Arsenal had been working hard, and Leefe Robinson had successfully proved their work at last to be good.

ZEPPELIN RAIDS ON GREAT BRITAIN

Date	*No. of Airships*	*Objective*	*Killed*	*Injured*	*Damage.*
1915					
April 14 .	1	Ipswich . .	0	1	Nil.
,, 15 .	1	Lowestoft . .	0	0	—
,, 30 .	1	——	0	0	One house.
May 10 .	1	Southend . .	1	1	—
,, 17 .	1	Ramsgate . .	2	1	—
,, 26 .	1	Southend . .	3	2	—
,, 31 .	1	London . .	6	3	—
June 4 .	1	East Coast .	0	0	Slight.
,, 6 .	1	——	24	40	—
,, 15 .	1	North-East .	16	40	—
Aug. 9 .	1	East Coast .	13	12	—
,, 12 .	1	East Coast .	6	23	Fourteen houses.
,, 17 .	1	Eastern Counties	10	36	One house.
Sept. 7 .	1	Eastern Counties	17	39	Several fires.
,, 8 .	1	London . .	20	86	—
,, 11 .	1	East Coast .	0	0	Nil.
,, 13 .	1	——	0	0	—
Oct. 13 .	Several	London . .	60	115	Several buildings.
1916					
Jan. 31 .	6	Eastern Counties N.E. & Midlands	67	117	Slight.
Mar. 5 .	3	N.-East and East	18	52	—
,, 19 .	6	East Coast .	0	0	Nil (driven
,, 31 .	5	E. & N.E. Counties	42	66	— [off).
April 1 .	Several	North-East .	16	100	—
,, 2 .	Several	N.E. and Scotland	11	11	—
,, 5 .	3	North-East. .	1	8	—
,, 24 .	4	Suffolk and Norfolk	—	1	70 bombs.
,, 25 .	2	E. Counties, Essex, and Kent	—	—	Trivial.

ZEPPELIN RAIDS ON GREAT BRITAIN (*continued*).

Date	*No. of Airships*	*Objective*	*Killed*	*Injured*	*Damage*
1916					
May 2.	2	Kent . . .	—	—	—
„ 3.	3	S.E. Scotland, N.E. Coast	—	—	—
„ 4.	6	——	9	27	100 bombs.
July 29.	3	N.-E. Coast .	—	—	Little.
„ 31.	7	Eastern Counties	—	—	—
Aug. 1.	Several	Kent, Essex, and Suffolk	—	0	—
„ 3.	8	E. & S.E. Counties	—	—	Trifling.
„ 9.	8	E. and N.-E. .	8	36	Slight.
„ 23.	1	East Coast .	—	—	—
„ 24–25	5	London . .	8	21	Slight.
Sept. 2–3	13	Eastern Counties and London	3	12	Little.
„ 23–24	12	London . .	38	125	Unimportant
„ 25–27	7	S. and E. Coast.	26	27	Slight.
Oct. 1.	10	East Coast .	1	1	Slight.
Nov. 27–28	Several	London . .	4	37	—

CHAPTER X

THROES AND GLORIES OF VERDUN

The Development of "Aces"—Contact Patrols—Guynemer—The Gallant Death of Sergt.-Major Terline—A record of French "Aces"—Sub-Lieutenant Marechal flies over Berlin—A Record of French Air Raids.

THROUGHOUT the 1916 long, grim struggle for Verdun, as was only to be expected, France's great aerial effort was centred around the stricken city. No enemy railway junction, bivouac, munition depot, railway line or station, military emplacement or fortress, within a radius of twenty geographical miles of the city but was raided at least a score of times by the daring French aviators during the ten months of the long protracted ding-dong struggle. Incessant were the efforts of the airmen. Night and day, day and night, the lithe, grey bombing planes swept up and disappeared into the mist of the battle horizon, in quest of legitimate objectives. Like flies over a summer pool aircraft hung over the French advanced lines, from Consenvoye to Fresnes, directing the courses of the great shells on to the enemy lines. Gaunt kite-balloons, the eyes of the lines behind the lines, of the artillery and the staff, peered out over the battling ranks of infantrymen at regular intervals of every half a mile. Lost in the wide sweep of rolling grey clouds overhead, the speedy, sinister battleplanes carried on the eternal struggle without mercy or cessation. Many, indeed, were the reputations made and lost in the skies over Verdun field.

The late Captain de Beauchamp, whose achievements place him first of innumerable French bombing pilots, from an aerodrome immediately behind Verdun started out on the two greatest air raids of the year; in September, bombing Krupp's works at Essen, and in November, with Munich as his objective, he flew over 437½ miles, and finally landed at Santa Dona di Piave in Italy. From the same locality Sub-Lieutenant Mare-

chal made his equally daring but ineffectual flight over Berlin, where, after dropping pamphlets, he was brought down by engine failure and captured by the Germans. Low flying attacks, but a few hundred feet above the enemy lines and trenches, were initiated in this great battle, which was to prove for our gallant Ally a second but victorious Waterloo.

The desperate, incessant nature of the fighting brought to light most of the great stars of the French air service. Verdun was to prove the nursery of famous "aces." Here it was that both Guynemer and Nungesser made their splendid reputations. Here it was also that the famous American Lafayette Escadrille first saw service. It was the Verdun troops that witnessed one of the most glorious aerial exploits in history—Sergt.-major Terline's heroic sacrifice, when, his machine-gun ammunition giving out, he deliberately rammed a German Albatros in mid-air.

The nature of the air fighing was influenced to a large extent by the developments of the surface battle. The latter may be said to have consisted of two main efforts; the enemy's overwhelming attack in the early spring, and the French counter-offensive of the following autumn. By the evening of Monday, February 21, 1916, aircraft had already begun to play their part in the great battle—locating in the Forest of Spincourt the German guns, which had opened with a fierce bombardment preliminary to an infantry attack on an extensive scale. The enemy intention was to cut off the French front lines from their reserves, and the attack commenced the following day, from the north about Harmont.

The German forces, which consisted of seven army corps together with a prodigious number of heavy guns, were commanded by the Crown Prince. Opposed to them were 250,000 French bayonets, under the leadership of, first, General Pétain, and, afterwards, General Nivelle, which were deployed in and about the defences of the fortress of Verdun, which fortified area it was the German intention to capture at all cost. The fortress itself, according to Whitaker, consists of a mountainous area divided by the Meuse into two sectors and defended, at a distance of seven miles from the town, by fortified woods and villages, and other outworks. On the right of the eastern bank

of the river, where the Germans first appeared, these outworks are indicated by such points as Conservoye, Brabant-sur-Meuse, Maumont, Ornes, Maucort, Mogeville, Fromexey, and Fresnes, which cover the main routes to Verdun from Sedan, Longevy, and Metz. In support of these outworks were the fortified points—Samogneux, Beaumont, Les Fosses Wood, Bezonvaux, Dieppe, and Vaux. Behind these again were Douaumont and Louvement, and then the forts encircling the town would have to be encountered by the assailant, such as Bras, Hardemont, Vaux, and Eix.

Contact Patrols

The German onslaught in February did not prove altogether successful, and by the end of March the eastern defences had not yet been seriously menaced, nor had the Germans attacked on the left or western bank of the river. The line Bras—Douaumont—Vaux proved to be the French line of resistance, a line plentifully supplied with highly efficient aerodromes. Although the village of Douaumont was taken on March 2 and the fort of Vaux surrendered on June 7, the French improvised new defences round Fleury, and, with the aid of innumerable aeroplane squadrons, maintained their hold on the right bank of the Meuse. It is believed that by the end of April the enemy had devoted thirty divisions to the attack on Verdun.

The Germans then transferred large bodies of troops to the left bank of the river and endeavoured to reach the Chalons—Verdun road; but they were arrested on the Varennes—Verdun road at Avocourt, Esnes, and Chattancourt by a new and wonderful development of French aviation: the daring airmen sweeping down to within only a few hundred feet of the enemy ranks, and supporting the infantry defence with their machine-guns and bombs. These low-flying airmen, engaged on what were afterwards to be known as "contact" patrols, by the end of June had caused the battle to simmer down into the familiar trench warfare, the German lines being then within five miles of Verdun on both banks of the Meuse—a result with which both sides professed to be satisfied, though the loss of life and expenditure of ammunition had been enormous. It proved, however, a great victory for aviation.

Primed with reconnaissance reports of these same aerial observers, the enemy eyes blinded alike by the fierce onslaughts of the French battle airmen, and the preliminary barrage directed entirely from the air, on October 24 the French took the offensive, and reported the recapture from the enemy of "the village and fort of Douaumont." General Nivelle's Second Army maintained the ground won in spite of repeated counter-attacks, and its commander summed up the exploit in the following terms in an address to the three divisions which General Mangin led to the attack: "In four hours, in a magnificent assault, you seized from your powerful enemy at one blow ground bristling with obstacles and fortresses north-east of Verdun, which he had spent eight months in taking from you in thin strips at the cost of desperate efforts and considerable sacrifices." And to this eulogy was added one, even more glowing, in praise of the work of the daring French airmen during the vicissitudes of the great battle.

Captain de Beauchamp's two great raids—those on Essen and Munich respectively—influenced directly the battle situation at Verdun. Twelve bombs he dropped most effectively on the Essen munition factories, which was the main source of supply of ammunition for the Crown Prince's armies before Verdun. And in Munich he succeeded in devastating the railway junction, a point of great strategic importance in the German lines of communication. Every French air-raid of any importance at this time, in fact, was directed against the Crown Prince's communications.

Guynemer was the first as also he was the greatest of the French "aces." In February, 1916, Guynemer was still a sergeant, but already had been awarded—unusual honour for one so young—the Legion of Honour, Military Medal, and the Military Cross. By the fifth of that month he had accounted for his fifth enemy machine. In age, he was then only twenty-one, but looked nineteen; a tall, slight lad with dark hair, but scarcely the shadow of a moustache. He had been a public school-boy at the outbreak of war, but volunteered immediately for active service, getting his flying commission nine months afterwards, in April, 1915. The flight of February 5, 1916, was his fourteenth over the German lines. His most exciting

experience to date had been when he, with another French airman, pursued three German aeroplanes. His bag that evening included all three of those German Aviatiks. On another occasion he had an extraordinary battle with a Fokker. Both machines circled one another, firing their machine-guns. Suddenly Guynemer dashed upward, and flew over the German, and while doing so shot the enemy aviator through the head. Guynemer just managed to get back to the French lines, his machine being almost a wreck. By the end of the year Guynemer had twenty-three German machines to his credit. But then, opportunities of distinction were never lacking to the French airmen during the fierce fighting of 1916.

If the two following instances may be taken as any criterion, the aviators did not prove themselves backward at seizing those or any other opportunities. During the month of April, for instance, French fighting aircraft, which were very active, particularly in the region of Verdun, obtained important results in numerous aerial combats, in which they undoubtedly had the advantage. Thirty-one German machines were brought down. Nine of these fell inside the French lines, and twenty-two were seen by observers falling in flames or completely smashed up in the German lines. During the same period only six French aeroplanes were worsted in fights and fell in the enemy lines.

"Strafing" the German Sausage

On the afternoon of May 28 French pilots were engaged in fifteen aerial fights with enemy aeroplanes. Two of the latter were brought down. One fell in flames near Monthois (Argonne), and the other in the region of Amifontaine (north of Berry-au-Bac). While on another occasion the French battle pilots achieved an amazing success. A little before six o'clock on the morning of May 22 an aeroplane squadron of the Army of Verdun went up and passed over the enemy's lines. A few minutes later six German sausage balloons which were flying captive above the right bank of the Meuse exploded. The French airmen had accomplished their mission; they had deprived the German artillery of its best means of observation and hampered its action very considerably.

A French soldier, amazed to see that the enemy's shells were falling well outside the zone which was usually swept so methodically by them, remarked to his officer: "Mon Colonel, we have put a bandage on the Germans' eyes. It is as though we were playing blind man's buff with them. They are firing as if they were drunk."

With this new development in aerial combat there waxed an unusual, and no less beautiful sense of *camaraderie* among the French battle pilots. In a pure spirit of friendly rivalry, they competed eagerly among themselves for the honour of having the largest number of German machines to their individual "bag." No sacrifice was too great; no deed too adventurous to attain this end. And when one of the gallant coterie, more daring than the rest, fell to superior enemy skill, like wolves of the pack, each and every one, naturally and as a point of honour, took it upon themselves to avenge the fallen comrade. It was impossible to eliminate the personal element from such methods of warfare. And many of the greatest feats were achieved by individuals, single-handed.

During a range-finding flight on May 28, a certain French pilot was attacked to the north of the Seine by a Fokker, which fired over 1,000 shots at him. In spite of this hail of bullets, and the fact that his machine was riddled, this pilot succeeded in getting back to his lines, pursued by his assailant. The latter was then attacked at a range of thirty yards by one of his companions, who had dashed out to his rescue at full speed, and was brought down near Bourgogne, to the west of Rheims. This is but one illustrative instance. Another was that of a duel between a French aeroplane and a Fokker, during which Lieutenant Cabanes met his death.

The German machine was sighted a long distance off, but as it was in the early days of the Fokker, Cabanes was unable to assure himself of its nationality until it opened fire. Cabanes was shot through the shoulder by the first salvo as he was preparing his machine-gun, and fell forward on to the pilot, gripping him so that he could not free himself.

A few minutes later the pilot—a corporal—received two bullets through the hand. With the other he endeavoured to manipulate his machine, but his adversary was faster and better

armed, and, circling above him, sent in a hot fire. Covered with his companion's blood, suffering agonies from his own wounds, and with his aeroplane pierced in a dozen places by the enemy's fire, the corporal endeavoured to plane down towards the French lines.

The two machines were by this time wing to wing, but the German suddenly realised the risk he was running in approaching the French lines, and after firing a last volley circled round and beat a retreat. A few minutes later the plucky pilot had brought his machine to earth within the French lines.

The gallant death of Terline

The German airman Kandulaki, who killed the famous French airman Pegoud in an air duel, was himself defeated and killed in an aerial fight which occurred a few days later near Mulhouse. Sergeant-Major Marquart de Terline, another of the French heroes, when his machine-gun ammunition gave out, deliberately rammed the German Albatros machine which he and two brother pilots were chasing, rather than allow his quarry to regain the enemy's lines. This gallant exploit was graphically described in the *Daily Telegraph* as follows:

"No more heroic deed has been recorded in this war than that of Sergeant-Major Marquart de Terline, who gave his life to bring down an enemy aeroplane. His machine-gun jammed soon after an air fight began, whereupon he deliberately drove straight at his adversary, rammed his machine, and both aeroplanes dropped to earth with their passengers dead. Terline, who was twenty-four, and had formerly served in the Cuirassiers, had been twice mentioned in dispatches, and had received the Military Cross for bringing down a Fokker. He had once or twice said, 'If ever I cannot shoot, I shall just go straight for the Boche aeroplane.'

"The fight began at 4 a.m. on Thursday, when an Albatros, driven by a well-known German aviator, a giant with red hair, nicknamed by the French 'Arminius,' appeared over the lines, making for Chalons-sur-Marne. In a few moments three French flying men were in the air after him in wild pursuit at 80 m.p.h. In spite of an incessant fusillade the enemy was apparently unhit, and he was nearing his own lines, while

munitions were giving out. The three Frenchmen resolved on desperate tactics. They endeavoured to surround the enemy, and, should firing fail, to bring him down in sheer collision. Two of the Frenchmen accidentally ran into each other, and both machines fell, the aviators eventually landing safe and sound.

"Terline was left alone, still firing his machine-gun, with the Albatros, mounted by two men, a pilot and an observer. Suddenly his gun jammed. The enemy was some 60 feet below him, nearing his own lines. 'Arminius' was still firing his machine-gun, and also shot with a carbine. Suddenly Terline came straight down and drove his machine into the rudder of the Albatros. Both aeroplanes fell instantly in collision, stuck to one another for some seconds, then parted in mid-air, and crashed to the ground just behind the French lines at 100 yards from one another. Sergeant-Major de Terline and his two adversaries had, of course, been killed almost instantly. Terline, whose heroic self-sacrifice had been watched through glasses by several officers, had been true to his word."

The French "Aces"

Terline was not an "ace." He had not brought down his quota of five enemy machines. His great sacrifice was made when he was still young, and new to the air. In this he was not alone. Some of the greatest of the French battle pilots did not survive their early days of apprenticeship in the great art of war. Pegoud, as has been said, was brought down and killed by the German Kandulaki early in the summer. Rochefort followed him two months later, and Lenoir was reported missing on November 9. The latter was lost during the series of terrific air-battles which were fought between November 16 and November 23, on which days, respectively, occurred no fewer than fifty-four and forty encounters with enemy machines. Of the survivors, perhaps the most interesting was Sergeant-Major Lufberry, of the famous American Lafayette Escadrille. Tarascon, again with eight Hun planes to his credit, had the distinctive misfortune of having an artificial leg. Several of the best of French and British pilots have been lame. In order told, the French "aces" were as follows:

FRENCH "ACES" IN 1916.

Name	*Number of German Machines*	*Date of Last Destroyed*
Second-Lieutenant Guynemer ..	23 ..	November 23
Second-Lieutenant Nungesser	18 ..	—
Sergeant-Major Dorme	15 ..	—
Lieutenant Heurteaux	13 ..	November 16
Second-Lieutenant Navarre ..	12 ..	October 26
Sergeant-Major Lenoir	11 ..	October 26
Sergeant Chainat	9 ..	—
Lieutenant Deullen	9 ..	November 13
Second-Lieutenant Chaput ..	8 ..	October 26
Adjutant Tarascon	8 ..	November 17
Second-Lieutenant de la Tour ..	7 ..	October 26
Second-Lieutenant Pegoud ..	6 ..	August 3
Second-Lieutenant de Rochefort	6 ..	September 2
Sergeant-Major Flachaire ..	5 ..	October 22
Sub-Lieutenant de Ullin ..	5 ..	August 28
Sergeant-Major Black	5 ..	October 26
Sergeant Viallet	5 ..	—
Sergeant Sauvage	5 ..	—
Sergeant-Major Lufberry ..	5 ..	—

Sergeant-Major Lufberry already has received some mention. Formed early in 1916, the Lafayette Escadrille was to leave a proud and glorious memory in French aviational history. With America standing coldly aloof from the war, these one hundred young Americans had freely volunteered their services to aid France in her hour of supreme trial. Their machines bore as a distinctive badge a Red Indian head. The majority of the hundred were still in training. So far the casualties had been three men killed—Chapman, Rockwell, and Prince—and two wounded—Lieutenant Thaw, who was again flying, and Bolsley, of Texas, who had been injured for life. Among the members of the Escadrille were: Lieutenant de Laage, Sergeant C. C. Johnson (New York), Captain Lawrence Rumsey (Buffalo), Sergeant J. R. McConnell (Carthage), Lieutenant William Thaw (Pittsburg), Sergeant R. Lufberry (New Haven, Connecticut), Sergeant Kiffir Rockwell (Atlanta), Adjutant Didier Masson (Los Angeles), Sergeant Norman

Prince (Boston), who was killed within a few weeks, and Adjutant Bert Hall (Galveston).

The Escadrille was fortunate in their training to secure the services of one of the greatest, as he was the most romantic of the French "aces." His story was unique even in the war. When hostilities broke out Nungesser was a Hussar of twenty-two. The rival of all the earlier "aces," including the great Guynemer, Nungesser was later runner-up to Fonck, and, still fighting gamely, was to outlive the war. On September 3, 1914, during the French retreat from Charleroi, he was mentioned in dispatches for having captured a German motor-car, put the German officers occupying it *hors de combat*, brought back the car and valuable papers which it contained under enemy fire, and, finally, placed his commanding officer, who was wounded, under shelter. The car was a French Mors, stolen by the Germans, and after that Nungesser used to be called the Mors Hussar. Some time after that, driving the same car, he passed some old soldiers who said: "Why is this mere youth a motor-driver, while we are in the trenches?"

Thereupon Nungesser refused to be a motorist any more. He became an aviator. He took part in fifty-three raids, and was thrice, as aviator, mentioned in dispatches. As an observer he took part in a raid on Ostend, and was said to have destroyed three enemy submarines. His third fight, with the German Fokker fighting scouts, was extremely exciting. Engaged with two enemy machines, he winged one with his quick-firing gun, and saw the observer pitch headlong to the ground. With another bullet he killed the pilot. The second Fokker fled.

At the Chateauford aerodrome, however, in February, 1916, while testing a new machine, he met with a serious accident, had his jaw broken, and sustained a wound in the skull and broken ribs. Five days he remained unconscious. When eventually he was allowed to leave the hospital, it was to find himself invalided out of the service. But this made him angry. He used influence, went back to the front in an aeroplane, and in one week brought down two enemy machines and one "sausage." Then he was promoted sub-lieutenant. His latest feat was to fight six enemy machines—three Fokkers and three

L.V.G.s. He saved himself by a brilliant idea. He dashed right among his enemies, who stopped firing for fear of shooting one another. Nungesser came back safe, with twenty-eight shots through his aeroplane, seven in the motor, one bullet through his shoe, and another through his helmet.

"Contact" patrol, ultimately to develop into a separate branch of war àviation, comprehensive, invaluable and brilliant as the bombing campaign on the German "back-areas," the battle airmen originated. Nungesser was one such. In fact, the French were first responsible for this branch of aerial activity, afterwards so widely adopted by every Allied air service. The infantry aviators, as they were called, watched the attack from the trenches and reported step by step the advance. They flew quite low over the foot troops, as the latter advanced, and even went down to less than 200 feet from the ground. They were the infantry air scouts, and the information they sent down gave commanding officers an assurance and confidence which could be equalled by no other means. Of their activity, even the correspondent of the German *Berliner Tageblatt* admitted, in September: "The French keep the occupying troops down with shells until the moment of advance, and employ at the moment of attack by assault airmen with machine-guns at the rear of the enemy." The value of the low-flying airmen to the harried French infantry during the time of stress and storm before Verdun cannot be estimated in mere words.

In the Somme offensive in 1916, for the first time, aviators and infantry went into the battle close together. A fleet of aeroplanes flying low, went forward with the French infantry. And each foot soldier felt that he was in immediate communication with the aeroplane buzzing so nearly over his head. Many a soldier, as he paused for a breathing space, waved his hand approvingly to the aviator, who was watching him from above. These aerial parties were continued unabated until almost Christmas. On December 15, for instance, before Verdun, where "heavy purple clouds filled the sky, but only a few scurries of rain and sleet fell during the day, and the dark hillsides rising towards the central crest of Douaumont remained clear of mist," the French airmen, on "contact" patrol bound,

swept on to the battle incessantly. Despite a strong and icy wind, the great biplanes and the little Nieuports came and went over the infantry ranks of the fierce battle. Everywhere the sky was splashed with the rising and falling flames of their signal rockets, and in every part of the front intrepid airmen swam in and out of the zone of death. Throughout the battle the French aeroplanes, despite clouds of shrapnel, circled constantly over the German lines, and one was seen boldly descending to within three hundred feet of the enemy trenches, and then flying away unscathed. It was a big biplane, which sailed calmly through the smoke of hundreds of exploding anti-aircraft shells, and seemed perfectly immune to their attack.

In the October advance before Verdun, protected by the artillery, large numbers of these low-flying airmen went up, and every quarter of an hour they made reports to the Corps General, throwing down notes containing all possible details. The majority of these aviators flew at a height of 400 feet, though some came much lower.

An extremely important position was taken by assault south of the Priez Farm, where the Germans had organised a veritable labyrinth of fortifications protected by numerous machine-guns. The artillery, advised by these French aviators, found the exact range, and wrought such destruction among the machine-guns and shelters that the Germans were forced to abandon this strong position, an operation in which they were materially assisted by the vigorous assault of the French infantry.

On October 24, in the same locality, a French airman came down to within 200 feet of the ground to attack an enemy motor-car. A German artillery column on the road between Conflans and Etain was attacked by another of these aviators on the 26th of the same month, from a height of only 300 feet, being thrown into the most appalling disorder. A week previously, in spite of the clouds 300 feet from the ground and a veritable and continuous barrage of fire between 200 and 300 feet, French aeroplanes had co-operated in the most effective manner in the fighting south of the Somme. They surpassed all that could be expected of them. One machine returned riddled with over 200 bullets. North of the Somme

two pilots attacked the enemy with machine-guns at short range in his trenches, flying very low.

French Mastery over their Enemies

These few instances render all the more interesting the facts of the innovation of the "contact" patrol in the war, and they are graphically supplemented by Mr. Warner Allen, the British Press representative with the French forces at this time. "The aeroplanes were only five or six hundred feet up," Mr. Allen wrote, "and it was their duty to warn the French batteries behind as to the progress made, so that the men should not suffer from the fire of their own guns. The progress of each unit was announced to the aviator above by signals. The kite balloons, watching the battle from the rear, were often at a loss as to the position of the advancing lines, but the airmen never made a mistake. To the inexpressible joy of the infantry, the French shells fell exactly where they were needed, just ahead of their lines, and moved steadily forward with their progress. And, though the aeroplanes received plenty of bullets and shrapnel in their planes, not a single one was brought down.

". . . . With heavy artillery the problem of giving eyes to the gunners, who are miles and miles in the rear, becomes increasingly difficult. The Germans first sought the solution in the kite balloon, or sausage, which was a valuable supplement to the aeroplane. At first they had practically a monopoly of the kite balloons, but now the tables are turned. The Allied aeroplanes were able to work havoc among the kite balloons, and on the Somme front yesterday one could see twenty French kite balloons and not a single German. Despite all efforts the enemy has been able to demolish only one French balloon, and that by an unsportsmanlike device which smacks of sailing under false colours. A German aeroplane, disguised as a French machine, with tricolour discs painted under its wings, succeeded in slipping through the French air patrols and destroying a captive balloon with explosive bullets.

"The French have in this district complete mastery of the air, and, consequently, the German guns are blinded. If the

enemy dares to run up a kite balloon, it takes all its force of aeroplanes to protect it. One of the great difficulties in the battle of Champagne was that of informing the artillery of the progress made by the infantry. This problem has been most satisfactorily solved by the 'infantry aeroplanes.'"

Thirty-two daylight and 110 night raids of importance throughout the year was the French bombing record. The French bombers frequently penetrated into Germany as far as Rottweil, Essen, and Metz. As a matter of fact, Rottweil was visited on not fewer than three occasions on August 12 and September 9 respectively. On the occasion of the latter visit, Flight Warrant Officer Baron and Flight Warrant Officer Emmanuelli bombarded the powder factory. They left their aerodrome at 8.50 p.m. and dropped at 10.55 six bombs of 6 inches, which were seen to fall in the region east of the powder factory buildings. Explosions were distinctly heard, and were followed by volumes of white smoke rising from the armament establishments. Without hindrance the aviators returned safe and sound at 12.50 a.m.

Other outstanding French air raids of the year were those of Captain de Beauchamp on Rombach, Essen, and Munich respectively. The station and military establishments of Metz were bombarded during the night of August 12. By the end of April, with the night raid on a factory in full operation at Hayange (annexed Lorraine), and bivouacs to the east of Azannes, carried out in spite of a very violent wind, one French squadron celebrated its hundredth bombardment. Rombach and Essen were raided on the night of September 23; the Bosch magneto factory at Stuttgart during the night of October 9; and the blast furnaces and factories of Voelklingen (on the Sarre) during the night of November 22. And Warrant Officer Baron, accompanied by a bombardier, left his aviation camp at 7.15 on the evening of September 22 and flew to Ludwigshaven, in the Palatinate, where three bombs were dropped on military establishments. Continuing their route, the French airmen dropped three more bombs on an important factory at Mannheim, on the right bank of the Rhine, where a vast fire and several explosions were noticed. The airmen returned at 12.50 a.m.

Inaugurated to put an end to the ruthless enemy campaign of raiding open and defenceless French towns and cities, numerous reprisal raids were carried out during the year on German military positions. Twenty-eight bombs were dropped on Etain railway station, also on Keyen, Essen, Terrest, and Houthulst. During the night of April 2 occurred the first punitive expedition reprisal for the bombardment of Dunkirk by a Zeppelin. On May 19 another and similar visit was paid by the French airmen to Wyfweg, Zarren, and Handzaeme; on May 21, to Wyfweg, and to Ghistelles, the enemy's great aviation centre in Belgium; Karlsruhe and Mulheim on June 22; and again Mulheim (on the east bank of the Rhine) during the night of July 13. These reprisal raids achieved immediate and drastic results. The French air-raiding campaign by this time had developed into an immensely strong arm of war, with appalling potentialities. No task was too dangerous, no objective impossible to these daring French bomb-raiding airmen!

A French Plane over Berlin

On his pamphlet-dropping expedition, which has already been mentioned, Lieutenant Marechal flew from Nancy, 811 miles, without a stop, and during the night of June 20 to Berlin. Over a month after this great flight, July 23, there appeared a report from Pinezow to the *Krakauer Zeitung*, of Cracow, that a French aeroplane had been observed by Austrian and German soldiers landing near Kawencyn (but 60 miles from the friendly Russian lines) in a field. The following day the story of this historic and glorious failure blazed the world. Officially from Paris it was reported that Marechal was forced by engine trouble to land at Cholm, in Poland, when only 63 miles from the Russian trenches.

Leaving Nancy at 9.30 on the evening of June 19, on a special type of Nieuport monoplane carrying enough petrol—a tank capacity of 165 gallons—for a 14-hours flight, he reached Berlin without difficulty. Over the German capital he dropped hundreds of proclamations, which were worded as follows: "We might have bombarded the open town of Berlin and thus killed women and innocent children, but we con-

tented ourselves with throwing the following proclamation: 'TO THE PEOPLE OF BERLIN, — Many clear-sighted Germans know to-day that the war was let loose by the military advisers at the Berlin and Vienna Courts. All the official and semi-official lies and perversions cannot do away with the fact that the German Government, with the connivance of the Austrian Government, desiring this war, consciously and with premeditation made it inevitable."

Lieutenant Marechal, who was heading for Rovno, in the Russian lines, at the time of his disaster, broke down with disappointment when forced to descend into Germany, and he was made a prisoner by the enemy. He was interned at Salzerbach, from which same prison camp, later in the war, he was to effect an historic and successful escape, and forwarded to the French authorities the following information:

"I was made prisoner on June 21 at 8.30 in the morning at Cholm. Austrian officers were disinclined to believe what I had done, but proof came and they had to admit the truth. It was sparking-plug trouble which made me come down. I landed, changed two plugs, and started the motor again, but unfortunately two others wanted changing, and I was captured. Imagine my sorrow."

This same Marechal spirit permeated all ranks of the French air services at this time. Though equally unsuccessful, the death of the great Captain de Beauchamp coincided with another as glorious failure. Strangely enough, de Beauchamp, a bombing aviator *par excellence*, was killed in the Douaumont region, September 23, in an air fight, his machine falling within the French lines. It was indeed a sinister turn of the wheel of an unkindly Fate. Scarce a month before he had carried out a particularly brilliant raid on Munich, leaving France in the morning, and eventually landing at Santa Dona di Piave (in Italy), as has already been stated. The previous September, returning in both cases without mishap, he had paid an equally daring visit to Krupp's works at Essen.

During the night of September 22 and 23, Captain de Beauchamp dropped innumerable bombs on the factories in the district of Rombach and Thionville, and proceeding thence to Westphalia, dropped twelve further bombs on Krupp's works at

Essen. Of his raid on Munich, an expert French commentator reported (November 18):

"Leaving France in the morning he flew in broad daylight as far as Munich, where he brought terror to the capital of Bavaria, successfully dropping several bombs on the station.

"Thus the innocent victims of the last bombardment of the open town of Amiens by the Germans have been avenged. Then, turning at right angles towards the south, he flew over the whole of the Tyrol and crossed the Alps, to land at length 12½ miles north of Venice in the village of Santa Dona on the small River Piave, having journeyed without stopping a distance of 700 kilometres (437½ miles).

"This daring raid proves the mastery which the French air service henceforth possesses, both from the point of view of the quality of the machines and of the ability of the pilots.

"Perhaps in the future the fear of punishment will make the Germans observe the rules of humanity."

The most important French air raids of the year were as follows:

DAYLIGHT RAIDS (32)

("A," Airship raid. "R," Reprisal raid.)

Date	*Objectives*
Feb. 21.	Château-de-Martincourt munition depots.
,, 21.	Habsheim aerodrome, Mulhouse goods station.
,, 21.	Pagny-sur-Moselle munitions factory.
,, 25.	144 shells on Metz-Sablons railway station.
,, 25.	Chambley military establishments.
Mar. 8.	Sixteen machines drop 124 bombs on Metz-Sablons station.
,, 13.	Brieulles station.
,, 15.	Forty-two heavy shells on Brieulles station.
,, 19.	Château-Salins ammunition depots, Dieuze aerodrome, and Metz station.
,, 19.	Seventy-two bombs on Habsheim aerodrome and Mulhausen goods station.
,, 29.	Fifteen heavy bombs on Metz-Sablons railway station.
April 23.	Wyfweg station.
,, 27.	Lamarche railway station.
May 17.	Metz-Sablons station.
,, 21.	(R) 250 bombs on Wyfweg and Ghistelles.
June 18.	Semide, Thionville, Etain, and Tergnier.

Date	*Objectives*
June 29.	(R) Karlsruhe and Mulheim.
July 6.	Lam-les-Maines railway junction.
,, 20.	Conflans, Mars-le-Tour, Longuyon, and Brieulles.
,, 21.	Metz-Sablons railway station (three times).
,, 21.	Vigneulles railway station.
,, 22.	Twelve French aeroplanes bombard Mulheim.
,, 30.	Mulheim.
Aug. 9.	Bazancourt and Damvillers.
Sept. 18.	Nantillois, Villers-Carbonnel.
,, 21.	Eight bombs of 120 mm., Habsheim station.
,, 25.	Sailly-Saillisel and Bois de Saint Vaast.
Oct. 10.	Peronne bivouacs, Tergnier, St. Quentin.
,, 22.	Hagendingen, Pussignes, Thionville.
,, 22.	Mons-en-Chaussée ammunition depot.
,, 23.	Spincourt station, Azannes bivouacs.
Nov. 22.	Six machines bomb Bruyérès and Ghistelles.
,, 22.	Railway stations of the Somme front.

NIGHT RAIDS OF THE YEAR (110)

Date	*Objectives*
Jan. 23.	Forty-five bombs on Metz-Sablons gasworks and station.
,, 27.	(A) Freiburg-im-Breisgau railway station.
Mar. 12.	Thirty bombs on Conflans railway station.
,, 17.	Forty bombs on Conflans and fourteen on Metz stations.
,, 19.	Dun-sur-Meuse railway station.
,, 20.	Dun-sur-Meuse and Audun-le-Roman stations.
,, 25.	Sixteen large shells on Nantillois bivouacs.
,, 29.	Mazieres-les-Metz station.
April 1.	Twenty-eight shells on Etain station.
,, 2.	(R) Keyen, Essen, Terrest, and Houthulst.
,, 2.	(A) Conflans station.
,, 10.	Nantillois and Brieulles.
,, 16.	Conflans, Rombach, Arnaville, and Pagny.
,, 16.	Nantillois, Brieulles, Etain, Spincourt.
,, 23.	Longuyon, Stenay, Dun, and Nantillois.
,, 23.	(A) Ten 6-inch bombs on Conflans station.
,, 25.	Etain, Damvillers, Brieulles, Conflans, Pierrepont.
,, 25.	Roye, Villers-Carbonnel, Biaches.
,, 26.	(A) Etain, Bensdorf, Annaville.
,, 26.	Thionville and Conflans stations.
,, 27.	Audun-le-Roman, Grandpré, Challerange.

Date	*Objectives*
April 28.	Hayange and Azannes.
,, 29.	Sebastapol, Etain railway, Spincourt, Grandpré.
May 10.	Damvillers, Etain.
,, 12.	Nantillois, Brieulles, Montfaucon, and Romagne.
,, 16.	Damvillersville, Brieulles, Clèry, Apremont.
,, 16.	Friscaty, Metz, Ars, and Arnaville.
,, 17.	Raucourt, Arrocourt, Sedan, and Azannes.
,, 18.	Murhange, Stenay, Montfaucon, and Azannes.
,, 19.	(R) Wyfweg, Zarren, and Handzaeme.
,, 20.	Thionville, Etain, Spincourt, Azannes, and Damvillers.
,, 20.	Metz-Sablons, Avricourt, Roye, and Chapelotte.
June 3.	Longuyon, Challerange, Savigny, and Laon.
,, 4.	Railway line from Ham to Nesle.
,, 9.	Ham and Polancourt stations.
,, 11.	120 bombs on Ham, La Fère, and Chaulnes.
,, 13.	(R) Mulheim (east bank of the Rhine).
,, 15.	Hombleaux, Roisel, Abbécourt, Tergnier.
,, 16.	Longuyon, Montmédy, and Audun-le-Roman.
,, 18.	Vongiers barracks and railway station.
,, 19.	Thionville, Montmédy, Brieulles, and Roisel.
,, 19.	Eighty-eight shells on Larrach military establishments.
,, 21.	Apremont, Grandpré, Savigny, Romagne.
,, 21.	Treves.
,, 21.	Thionville, Arnaville, Laon, and Saint Erni.
,, 22.	Conflans, Vigneulles, Driluge.
,, 24.	Pierrepont, Longuyon.
,, 25.	Thionville, Rombach, Dun, Vilesnes.
,, 26.	Tergnier, Chauny, Coney.
,, 30.	Thionville, Conflans, Etain.
Aug. 2.	Ham, Noyon.
,, 3.	Montmédy, Sedan, Damvillers, Noyon.
,, 5.	Combles, Noyon, Stenay, Sedan, Conflans.
,, 6.	Metz-Sablons, Thionville, Rombach.
,, 8.	Audun-le-Roman, Longvillon, Montmédy.
,, 8.	Rottweil powder factory.
,, 9.	Lassigny-Combles, Dugney, Appilly.
,, 9.	Vouziers, Bazancourt.
,, 12.	Metz-Sablons, Metz.
,, 21.	Tergnier, Noyon, and Appilly.
Sept. 2.	Metz-Sablons, Conflans, Sedan, Ham, Nesle, Guiscard.
,, 6.	Rosch and Villecourt.

Date	*Objectives*
Sept. 9.	Etain, Conflans, Rombach.
,, 9.	Rottweil powder factory.
,, 9.	Chauny, Ham.
,, 10.	Bruges, Somme-Py, Sarrebourg.
,, 11.	Semoncourt, Metz, Dillingen.
,, 12.	Guiscard, Roisel, Handicourt, Etain, Damvillers.
,, 14.	Tergnier, Chauny, Guiscard, Stenay, Dillingen.
,, 15.	Betheneville, Pont Faverges.
,, 15.	Uthingen, Rombach, Mondelingen.
,, 15.	Metz, Bernsdorf, Spincourt, Longuyon.
,, 17.	Habsheim, Tergnier, Abbécourt.
,, 22.	Ludwigshaven, Mannheim.
,, 22.	(A) Marcoing.
,, 22.	Fins, Epehy, Roisel, Harvilly.
,, 23.	Rombach and Essen.
,, 23.	Ham, Hombleux, Manancourt, Vreignes.
,, 24.	Guiscard, Thionville, Rombach.
,, 24.	Dillingen, Sarrelories, Metz-Sablons.
,, 25.	Laon station.
,, 26.	Appilly station.
Oct. 4.	Colmar aerodrome.
,, 6.	New enemy station at Vigneulles.
,, 9.	Stuttgart (Bosch magneto factory).
,, 10.	Colmar aerodrome, Mulheim station.
,, 11.	Vigneulles railway station.
,, 20.	Nesle, Ham bivouacs and Metigny aerodrome.
,, 20.	Train between Appilly and Chauny.
,, 20.	Forty-one bombs dropped on Noyon and Chauny stations.
,, 21.	Sixteen bombs on Etain bivouacs.
,, 21.	Fifty bombs on St. Quentin and Tergnier stations.
,, 21.	Courcelles railway station and Metz.
,, 22.	Rombach factories.
,, 23.	Spincourt station, Azannes bivouacs.
,, 26.	Grandpré and Challerange railway station.
,, 26.	Conflans station and Courcelles.
,, 31.	126 bombs on Ham, Athies, and Peronne aerodrome.
Nov. 11.	Ham, St. Quentin, Tergnier, Nesle, Dienge aerodrome.
,, 16.	15,000 kilos of bombs on Erch-sur-Alzette and Tergnier.
,, 17.	157 bombs on Golanscourt and Grisolles aerodromes.
,, 20.	100 bombs on Somme front, on enemy bivouacs.

Date	*Objectives*
Nov. 22.	Volklingen blast furnaces and factories.
,, 30.	Thionville factories, Damvillers bivouacs.
Dec. 1.	Nine bombs on Spincourt station, Billy-sur-Largrennes.
,, 2.	720 kilos on Thionville factories.
,, 9.	Bombs on Martigny, Ham.
,, 10.	Munition dumps north of Verdun, Romagne-sur-des-routes.
,, 18.	500 kilos of bombs on Dun-sur-Meuse and Montmédy.
,, 20.	Brieulles-sur-Meuse and Charleville-Meziers.
,, 20.	480 kilos dropped on Anizy station.

CHAPTER XI

THE R.F.C. IN THE EARLY DAYS OF 1916

The Conditions Grow more Intense—Specialised Work is Necessary—An Unfortunate Accident—The Fokker—A Personal Encounter—Praise from Sir Douglas Haig.

By January, 1916, aviation had developed a fine art of war. The incessant and brilliant development of the enemy service, the main strength of which was pitted against the British forces, demanded as a counter-measure an immediate definition of policy of aerial attack and defences. During the last thirty months of the war, many new and unrealised branches of aircraft work were brought into being. In the 1916 campaign, roughly there were four phases. Dependent upon the general battle situation, it may be said that the air attack commenced with a wide reconnaissance of the enemy's lines. The enemy then naturally would attempt to follow suit. This counter-operation, in its turn, necessitated the creation of the "chaser" machine, a light aeroplane, rapid, and climbing very quickly, so as to dominate the adversary—a favourable position in aerial combat. And lastly were developed counter-chasers, whose object was to defend reconnoitring aeroplanes, scouting, artillery directing, bomb-dropping, against enemy chasers. These latter were of the same type as chasers, but more adequately armed. Before Cambrai, in June of this same year, it is possible to trace the development of one such aerial battle in miniature.

A British reconnaissance patrol, preliminary to the artillery barrage and subsequent infantry attack, flying over the enemy "back-areas," at last drew three Fokkers into the attack. The enemy were first seen diving at our machines from the rear, with the sun behind them. Our machines, which were heavily fired at, retaliated as occasion offered. Soon after the fight began one of the Fokkers was seen to turn half a loop, sideslip

badly and nose-dive. It was last seen nose-diving, having apparently been hit by our fire.

One of our machines was last seen soon after the commencement of the fight; but owing to the fact that all the machines were busily engaged in the running fight, which was of a persistent nature, its fate was not observed. About the same time, however, Lieutenant C., pilot of one of our machines, reported that a machine, apparently out of control, dived over him, almost touching his top plane, and disappeared, no more being seen of it. The two remaining Fokkers pursued our reconnaissance, one breaking off the fight or else being compelled to descend before reaching the lines, while the third followed until within the zone of the advanced German anti-aircraft guns.

Attack and Defence

The same afternoon (June 1), the German commanders, realising that some large concerted movement on our part was toward, feverishly dispatched a large reconnaissance patrol for the British lines. Encountered in the neighbourhood of Arras by two pilots of the R.F.C., Captain Y (official record), on a Nieuport, and Lieutenant Z, on a de Havilland, one of these German machines was driven down near Terre Mesuel, east of Doullens; the remainder precipitately wheeling for their own aerodrome again. The craft driven down landed on its left wing, inside our lines, the pilot and observer being captured and portions of the machine salved.

Apparently this encounter scared the Germans, for it was not until the actual battle that their machines again attacked the British lines. They came then in swarms: reconnaissance machines, chasers, and counter-chasers by the score. British aeroplanes of every description in this area were forced into defence against this fierce and continued aerial attack. On June 10 Lieutenant K and Captain L (our official records of this period never reveal full names), when on artillery duty, saw a Fokker flying over the enemy's trenches. They followed the German for about 1½ miles in the direction of Lille, where he turned to attack. Our officers opened fire at a range of about 50 yards. When level with the tail of our machine the enemy turned sharply and dived, and was further fired at as he

turned. He dived more steeply, and was observed by Lieutenant K to crash to earth in a field near Haubourdin.

A week later, the 17th, Lieutenants M and N left their aerodrome at about 12.45 p.m. to intercept a hostile reconnaissance. Eight hostile machines were observed at 7,500 feet, approaching from the direction of Doullens. The British machine flew towards them, and when almost directly underneath, Lieutenant N opened fire. The British machine then turned, and when at about 400 feet below the German formation, opened fire into one of the tail machines. A few minutes later this machine was seen to glide down, and passing low over the trenches, land just north of Bois de Biez. Lieutenant M now endeavoured to cut off the main body of hostile machines. In this he failed, but succeeded in catching the last hostile machine just over the trenches at 6,000 feet. When within 100 yards the German dived steeply, followed by our machine firing at about 50 yards range. The enemy observer appeared to be out of action, as no reply was made to our fire. Lieutenant M continued the pursuit until within 2,500 feet of the ground, when the German was seen to land in a field about a mile north-east of Achiet le Petit. Our machine recrossed the trenches at 2,500 feet. Altogether there were thirty combats in the air on this day.

Two machines, Pilots Captain O and Lieutenant P; Observers, Lieutenant Q and Sergeant R, working together, on June 18, encountered two Fokkers east of Lens at 4.15 p.m. at about 9,000 feet. The machines chased the Fokkers down, diving steeply in small circles, and firing all the time. Captain O, being short of petrol, left his opponent, diving vertically at about 2,500 feet. The other Fokker was shot down by Sergeant R, and fell to earth from 4,000 feet. At the same time Lieutenants S and T, No. 3 Squadron, engaged and dispersed a column of infantry in Martinpuich with machine-gun fire. While another machine, Pilot Lieutenant U and Observer Corporal V, when patrolling over Annay at about 9 p.m., attacked three Fokkers seen behind the enemy's lines. One of the latter went off. The remaining two made for Lens, towards another British machine, which they attacked. Lieutenant U followed and joined in the fight, diving on to one of the attacking Fokkers, which turned away, and dived perpendicularly. It was seen

by an anti-aircraft battery to fall to the ground. When Lieutenant U turned again the other British machine and Fokker had disappeared. This British machine was missing, and was reported to have landed in the enemy's lines.

This one offensive phase of counter-patrol was vital, inasmuch as it guaranteed against interference on the part of the enemy's pilots, with the necessary innumerable branches of aircraft activity of a semi-offensive nature, as reconnaissance, the photographing of enemy positions, aerial location of gun emplacements, notification of the arrival of his reinforcements to our own Staff, and the subsequent aerial bombardments to cut, or at least disorganise, the enemy's lines of communication, and chasing and counter-chasing operations. Where attack was simple, necessary defence against that attack was an art unto itself.

Types of Plane for Special Work

At first it was considered by aircraft constructors that reconnoitring qualities could be combined in one type of aeroplane, suitable alike for scouting, combat, and bombing purposes. The exigencies of air war, however, influenced to no small degree by specific qualities of speed, weight, armament, and defence, soon called for a distinct type of aircraft for each branch of activity. In turn were developed four types—scout, artillery direction, bomb-dropping, and battle machine. The battleplane, as the last-named was called, at this time was the latest product of military aviation. By no means on the large side, and usually a single-seater type constructed in such a way as to permit of firing in every direction, the pilot of this machine combined the duties of gunner and observer. The object of the purely scouting type of machine, on the other hand, was to examine the enemy lines, first by eye, and afterwards by means of photography. Modern trench warfare considerably reduced the range of action necessary to the scout, in which machine particularly were developed facility of manœuvring and climbing power in order to escape from enemy chasers.

The one craft was throughout the war to the other as were David and Jonathan. As branches of the air activity they were inseparable. The scout hovering dangerously low, far behind

the German lines, would be spurred on to greater effort by th comforting knowledge that, incessantly, far overhead, hidde in the clouds, a fleet battleplane was guaranteeing him safet from attack by enemy chasers. And if the battleplane pilots in their spectacular pursuit, gleaned rather more than thei share of the general kudos, they would be the first willingly t admit the undoubted use and gallantry of the scout machine which it was their duty to escort.

For conspicuous gallantry when making one such specia reconnaissance, Captain A. W. James, R.F.C., in May, 1916 was awarded a timely D.S.O. Owing to clouds, he crossed the lines at 1,500 feet, and seeing signs of movement in a par ticular locality, he came down to 800 feet in order to get a bette view. He recrossed the firing lines at 500 feet with very valu able information, under heavy fire from rifles, machine guns, anti-aircraft guns, and field guns. His engine and machine were badly damaged by the enemy's fire. Another reconnais sance pilot managed to land his machine safely in a British aerodrome and without injury to his observer, after his plane had been struck by a German anti-aircraft shell, and his leg practically severed. A most peculiar adventure befell yet another. Flying a brand-new machine from Farnborough to join his squadron somewhere in the north of France, he lost his way *en route*, came down within the enemy's lines, and was taken prisoner.

It was a matter of geography, or rather lack of it. The pilot of this F.E.2.D. machine never had been to France before. Leaving Farnborough on the morning of June 1, he flew the Channel and kept on flying until he arrived over a landmark familiar to all R.F.C. pilots, what he took to be the St. Omer Canal. Now there are two almost identical water ways in Flanders, one at that time well within the British lines, the other at Lille, well within the lines of the enemy. Unfortu nately, it was from the latter which this reconnaissance pilot took his direction. Crossing the firing lines in the neighbour hood of Armentières, he landed at Lille aerodrome, and thus his latest type machine was delivered without a scratch into the enemy's hands. A subsequent and sarcastic German wireless message could inform us that the machine and officers had

landed unhurt, and thank us for the engine and plane, which, they said, would be "most useful" to them.

Really Bad Luck

Another pilot was victim of most astonishing bad luck. When photography bound, one July morning, he was followed by several German machines at long range—opening fire occasionally with a few rounds—but he was ignoring them. He had almost got back over the British lines again when an unlucky shot got him in the thigh. Gamely he stuck it to the end, and landed his machine just this side of Ypres. His observer, helped by some gunners, got him out and took him to a farm, where they bound him up and then sent him down on an ambulance to the dressing station. But the main artery had been cut, and the poor fellow died from loss of blood an hour afterwards.

It was a magnificent effort bringing the machine over the lines and landing it, thereby saving his observer, when he was half fainting the whole time through loss of blood. And it serves an excellent illustration to the great dangers habitually confronted by these daring reconnaissance and photography pilots.

The enemy, early in 1916, were experimenting with a new policy of attack and defence, and pushing the celebrated Fokker campaign for all they were worth. A run of bad luck on our side following the sudden appearance of the latter craft over the enemy lines perhaps over-emphasised its value as a type. As elsewhere already has been stated, the Fokker was an unusual machine for that period of the war, developing a speed of 100 m.p.h., while the pilot-gunner, by the grace of special mechanism, was able to fire through the revolutions of the propeller of his machine, with an unlimited field of fire ahead of him. The Fokker machine was developed for a special purpose; a sort of super "chaser," to destroy effectively any British reconnaissance or chaser aeroplane which ventured over the German lines. It was a purely fighting machine, built exclusively for chase, and neither stable enough nor able to carry enough petrol for reconnaissance work.

At the outbreak of hostilities such a machine would have

been unnecessary to the enemy air service. With a comfortable preponderance alike of aeroplanes and men, the Germans woefully outnumbered us, and all the time carried the war in the air over our own lines, and into the teeth of our tiny R.F.C. If the latter, however, were lacking in numbers, they had plenty of spirit and determination. When the German hordes so unexpectedly and disastrously were pulled up in Flanders, when in a single agonising day the enemy's dreams of world dominion were shattered about his ears, the delicate balance of effort of that most delicate and efficient war machine in history was effected materially. The German High Command had anticipated a war of but a few months' duration. The momentum of their Herculean effort dangerously hung fire. Where formerly they had held an overwhelming preponderance in the matter of aircraft, where previously all the time they had carried the air war over our lines, immediately they were forced to fall back on the defensive. And this policy, with infrequent and favoured lapses, they maintained until November, 1918.

This policy of defence may be developed in stages with the history of certain much-advertised types of German machines, as, for instance, the Halberstadt, the Roland, and later the Albatross scout and the Gotha bombing-plane. However, the Fokker was the first of these machines.

At this period, as incessantly throughout the war, our pilots and aeroplanes were extremely busy reconnoitring over the German lines. As against this, the enemy, concentrating the full force of his pilots and machines on the defensive, was at a distinct disadvantage. For one German machine which flew over our lines four British machines crossed theirs. Lying in wait for our scouts in its own country, the Fokker was able to climb very quickly, and then made a hawk-like swoop, escaping back to its own lines if it met with serious opposition. But that the Fokker was not invincible may be judged from the following summary of the work of British airmen, compiled at a time when the much-boomed German machine was at the zenith of its fame.

On one glorious occasion a British aviator attacked three Fokkers single-handed and destroyed two of them. "We have evidently," wrote another pilot of a similar encounter, "accom-

plished the first stage of the push. Lord! the country is a sight where all the fighting is going on. I came back over it the night before last. We were attacked by three Huns, one with a double engine. There were three of us. We were 35 miles east of the lines, and we drove them off and sent two down (not crashes though), and continued our job. I was very pleased, as my observer did splendidly, as my gun wouldn't fire, and the other two never saw the Huns for ages. I had seen and kept watching them for a quarter of an hour. One ought to have got us, as he dived right on me, but I think we hit him a good hit."

In a period of eighteen days, from May 4 to 21, when the enemy air attack was at its fiercest, no fewer than thirty-six encounters of note occurred between British and German planes. On May 4, for instance, Lieutenant D.—the mystery is unavoidable—a British pilot, with Second-Lieutenant D., his observer, attacked two hostile aeroplanes, a Roland and an Aviatik, over Fromelles. The hostile machines came from the north-east at 8,500 feet and 8,000 feet respectively. Lieutenant D. steered straight towards them. The Roland opened fire at 150 yards, and Second-Lieutenant D. at 70 yards. The Roland turned, the observer standing up to fire. Lieutenant D. followed, and the Aviatik came up behind him and opened fire. Both pilot and observer of our machine were now firing, being between two hostile machines. They got within a few yards of the Roland, which ceased fire and dived deeply, but apparently under control, towards Wavrin. The observer was apparently hit, as he disappeared from view, and firing ceased. Lieutenant D. then turned towards the Aviatik, which, however, went down in the direction of Wavrin. Lieutenant D.'s machine was badly damaged, but pilot and observer were unhurt.

Second-Lieutenant C., on a de Havilland, sighted a hostile machine flying south at about 1,500 feet between Hem and Cléry. He dived down and overtook the German, who also dived close to the ground, firing about 12 rounds at a range of 50 yards. The German machine tried to land, but hit a wire fence and broke up. Second-Lieutenant C. climbed to 200 feet, when he again dived, firing the rest of his drum at the pilot and

observer, who were running across the field. One of them fell, and the other took refuge in a shed. Meanwhile Second-Lieutenant C.'s thumb-switch had jammed and he was forced to land, but the bump on landing loosened the spring, and he got off again, crossing the lines at about 500 feet under heavy fire.

The Fighting in May, 1916

Twenty-seven combats in the air took place on May 16. Lieutenant D. and Corporal S. on an F.E. attacked an Albatross when approaching Lille. Half a drum of ammunition was fired, and the hostile machine spiralled rapidly down, firing occasionally. Later, the same machine was observed climbing again over Lille, and following the F.E. at about 500 yards. Lieutenant D. wheeled sharply and opened fire at close range. The Albatross sheered away to the right, followed by the F.E. still firing at close range. The hostile machine then went down rapidly, and was seen to strike the ground at a cross-roads south of Lille. Smoke rose from the spot and only one wing was visible. The F.E. was then attacked by a Fokker monoplane, which was driven off.

Second-Lieutenant B. the same day, on a Bristol scout, when flying at 12,000 feet, saw an Albatross at 5,000 feet over Givenchy. The hostile machine turned towards Beaumont, followed by Lieutenant B., who opened fire when about 2,000 feet above, and continued until within a few yards. The hostile machine turned and got into a nose-dive, and when about 2,000 feet from the ground was seen to turn upside down.

On May 19 there were many victorious combats. Lieutenant P., on an F.E., observer, Air Mechanic H., on patrol north-east of Ypres, sighted three hostile machines. He engaged one of them, which turned and met him face to face, being slightly below him. Fire was opened, and the enemy machine side-slipped and then dived vertically. The F.E. saw no more of the hostile machine.

Sergeant N., on a de Havilland, sighted a hostile machine over Bixschoote flying north. He flew towards Langemarck, and cut off the hostile machine from its own lines. It was then below him, and did not observe him. He dived, and fired a drum, but while reloading lost sight of the machine. One

hostile machine was seen to fall in the enemy's lines. This was probably the first of the above machines.

Lieutenant R., on an F.E., observer, Lieutenant M., encountered a Fokker. Fire was opened at 50 yards, and the enemy machine side-slipped, turned on its back, and crashed to earth. Its fall was observed by a B.E.

An Aviatik, the following afternoon, was engaged by three of our machines over Adinfer Wood—viz., two F.E.'s, pilots, Captain A. and 1/A.M. C.; observers, Second-Lieutenant C. and Corporal H.; and a B.E. 2c., pilot, Lieutenant F.; observer, Second-Lieutenant C. The B.E. attacked first. Air Mechanic C. then dived from 9,000 feet, and attacked the Aviatik at 5,000 feet. Finally Captain A. closed to within 20 yards, and fired two drums at the Aviatik, which went down in a nose-dive, and crashed into the trees.

An Albatross was attacked by three of our machines over Pozieres, a Martinsyde, pilot, Captain S., and two de Havillands, pilots, Lieutenant W. and Second-Lieutenant T. Lieutenant W. attacked first, opening fire at 50 yards, and turned aside owing to his gun jamming. Captain S. on the Martinsyde then attacked at 30 yards range, apparently without effect. Second-Lieutenant T. then dived on to the hostile machine from above and fired a drum at 40 yards from behind it. The hostile machine burst into flames, and fell between Pozieres and Contalmaison.

Finally, on May 21, Second-Lieutenant T., on a Martinsyde, flying at 12,500 feet, saw an Albatross over Fromelles at about 9,000 feet. He dived at it, reserving his fire till within close range. Both machines were diving at high speed with engines on. Second-Lieutenant T., having expended one drum, changed, and continued the attack. The enemy endeavoured to manœuvre out of fire, turning in all directions, but Second-Lieutenant T. manœuvred his Martinsyde and managed to keep the enemy under fire at intervals. At about 4,000 feet over the south-west corner of Lille the machines were so close that they nearly collided; but the enemy, after descending in a vertical dive, recovered himself and escaped.

How the Germans now began to dread these encounters! Invariably, an invincible British soloist would come hurtling

down into the midst of some orderly enemy formation from the clouds; as invariably, one or more of the German planes would go crashing to the ground to his onslaught. Had the High Command not strictly prohibited their pilots from venturing over the British lines, it is even doubtful whether individual enterprise would have dared. After all, the air is a big place, and it would have proved a simple enough matter. It is no disparagement to write this of an enemy who was both scientifically and organically better equipped at this time than any of the belligerent air services, and whose pilots, though lacking the dash and daring of our own men, were not altogether lacking in courage; at the same time, curiously enough, it explains their disinclination either to attack a British plane or to venture over our lines. By all the rules of war—as the enemy understood them—victory in the air was a foregone conclusion. Better organised, better equipped, numerically superior, it was the individual efforts of the British pilots which, above all, frustrated the long and well-laid plans of the enemy in the air. German notions of psychology did not permit of this understanding. Then, how could he be expected to anticipate such a personal prowess as that indicated by that previously mentioned single-handed attack of a British aviator on three German machines?

It was all in the day's work as far as that very gallant airman was concerned. Originally sent out to escort, and flying 2,000 feet higher than one of our reconnaissance planes, two Fokkers suddenly appeared behind the latter machine. Without hesitation, the British scout dived at the left-hand enemy plane. Down it plunged, at least 6,000 feet, in a steep nose-dive. The other Fokker meanwhile had climbed higher than his British adversary, but the latter chased up the sky and came to within 100 feet of the enemy, when he opened fire again. This latter machine, again after thirty rounds had been fired, nosed-dived 4,500 feet to earth, into a ploughed field. The British scout climbed again to about 11,000 feet, and discovered a German Albatross aloft, behind and above one of our scouts. It fled after a short encounter. But it was not the last adventure of the day, for on returning to our own lines the British pilot saw another Fokker amongst a little group of British biplanes on

reconnaissance, like a wolf among the sheep. But the "shepherd" scared it, and down went the third Fokker at a very steep angle, until it disappeared, still nose-diving, 3,000 feet below.

A Personal Encounter

"Yesterday being the first fine day," wrote an officer of the R.F.C. about this time, describing a personal encounter to his parents in England, "I had instructions to go up in an F.E. with P. as observer, to take some photographs over ———. It was about the most unpleasant job going, as the numerous woods about there are absolutely bristling with 'Archies' of no mean prowess, as I can testify, having had, perforce, to sample some of their wares on many a reconnaissance of late. They are poisonous chaps.

"It took us roughly an hour to get up to 9,000 feet, which time we spent between—and—climbing, climbing and climbing still. The air was pretty full of machines, it being the first fine day for some considerable time. We saw no Huns, though we afterwards heard that there were three hanging about behind their lines, and worrying a number of our fellows doing photography. Twenty to twelve found us east of ———, not far short of 10,000 feet up, and distinctly chilly.

"A biplane and a monoplane appeared east of us, the biplane leading, with ample evidence of being in a hurry, with the monoplane—which appeared to be one of our Morane type—overhauling it hands over fists. We were about 2,500 feet above the 'buses,' and when within about a mile I got a glimpse of the monoplane's top wing. Black crosses on a white base. Good enough!

"Down went the F.E.'s nose almost vertically; 2,000 feet we came down, while the air speed indicator went up to 160 m.p.h. and then stuck, not having been designed for the purpose of exceeding recognised limits. I expected the F.E. to fold up under the strain any moment, but she stood it like a rock. By this time the other two machines were almost vertically below us—the Hun had caught up the biplane, and was emptying his gun into it at 50 yards range. It subsequently transpired that just at this moment he had put three bullets in the observer's arm and one through the main petrol tank, with the

result that the precious fluid was pouring all over the pilot, observer, and fuselage.

"I started pulling the F.E. out of her nose-dive about 200 feet above the Hun, as too sudden a shock would inevitably have crumpled her up. The consequence was that we found ourselves above and behind the unfortunate Teuton, and within 20 yards of him. To my mind he never saw us until we opened fire. Twenty rounds of lead were planted into the back of his neck, though apparently they did not hit him. He then turned his attention to us, turning left-handed and passing directly below us. This necessitated our getting on to a perpendicular bank and doing a complete circuit to see where he'd go to. The little beggar was describing circuits round us, while we did a sort of 'Inner Circle,' conducted, of course, with a perpendicular bank; but owing to the fact that our speed was so great and that we were doing complete turns in about twice the length of our machine, the centrifugal force was so great that 'P.' couldn't hold the machine-gun on its mounting; it swung down, and though the whole gun only weighs 28 lb., he could not pull it up square.

"Things being at the moment distinctly unsatisfactory, we were not sorry to see the Hun head for home. After him we went, both diving lustily, while 'P.', more familiarly known as 'Pongo,' gave him the rest of the drum—another twenty-eight rounds.

"I was beginning to get a little anxious, as we were getting very low and expecting 'Archie' to get us any minute, when we got him. A lucky shot found its billet, and the pilot was no more. The evolutions that machine described falling 7,000 feet, with no man at the wheel, were extraordinary, viewed from above—first wheels up, then right way again, a loop, several cartwheels, a nose-dive, more loops, and several turns on to and off its back, sideways, until it was lost to sight almost on the ground. Good enough!

"By this time another F.E., a Bristol scout, and two 2c.'s had arrived, but—fortunately for me—too late to claim a share in the finale. The next I remember doing was looking at my watch—12.45. The incident over, we started climbing again, as those infernal photographs had to be done. At this point

the engine began to have a say in the matter, and one cylinder decided to strike. So homeward we wended our weary way. Quite an ovation on landing—the only person who wasn't cheery was the unfortunate observer of the 2c., who entered into the commencement of the scrap. The satisfaction of knowing that the Johnny who'd pushed three holes into his right arm—considerately avoiding to touch the bone—had been properly 'strafed,' didn't bear any weight.

"The Major was delighted, as it was the first machine of this type to show up in this quarter. A number of Fokkisers, as the German Moranes are called, have been giving our machines a lot of trouble down south, and it is rather thought that this one may have been a picked pilot sent up to put some more heart into the other machines working in this sector of front. For this first appearance he had certainly done remarkably well, driving off three of our machines and wounding an observer. For speed and climb he left our machines absolutely, so he was well out of the way.

"I must say that he was the first German we have run across who put up anything like a real decent show, and our jubilation is tinged with regret at the loss of a very gallant fellow. So much for the episode itself.

"We got back satisfactorily to a late lunch, and soon after having entered up our report as to whether or not the machine was worth salving, were granted permission to go up to the wreckage. X and I, with a flight-sergeant from my flight and a mechanic, set out about four by car. . . . A walk of 500 yards brought us up to a line of trenches and dug-outs about 100 yards from the German trenches, though screened from those nearest us by a slight rise in between. That we were in unpleasant proximity was soon apparent, as the 'Phew! phew!' of the bullets came with most disturbing regularity. All the time star-shell-magnesium flares went up and made you sit as still as a rock, as the least movement would give one away. But by now we had reached the wreckage.

"As far as I gathered, viewed from the ground, the fall was full of excitement, and our troops for four miles along the line had stood up and cheered to a man for several minutes on end. In fact, a few had said to the officer in command of

the battalion—so he told us—that they all felt that it was worth four days' discomfort to see it come down 7,000 feet, as the engine was going all the time, and it only took thirty-five seconds to drop the best part of two miles. You can imagine the pace it was going when it hit the ground. Finishing its descent in a nose-dive, as I said, with its engine going, it first struck the top of a dug-out. It would seem that fellows watching its descent and seeing its course to be headed towards them, had taken refuge in a dug-out. The roof was built of trunks of trees of reassuring dimensions, covered with 3 feet of earth.

"The impact was so great that, owing to the weight of the engine, it had gone slap through the roof and buried its nose into the bottom of the dug-out, leaving a portion of its tail outside, but the rest so telescoped as to occupy not more than a cubic yard. Remembering the fact that this type of machine has an all-steel frame, and that behind the pilot's seat there is nothing of weight, it helps to emphasise what a colossal speed he must have been travelling. The four occupants of the dug-out were all wounded as a result, but none seriously.

"Of what we saw in that dug-out, 10 feet by 12 feet, by the light of an electric torch through the smoke, the time being midnight and shells going off all round, I shall never forget as long as I live.

"As mementoes of a very gruesome occasion I have got two decoration ribbons which the observer was wearing—though no medals were found; one of the ribbons is that of the Iron Cross. I have also the magneto from the engine and a pistol for firing coloured flares to range their anti-aircraft batteries on our machines, a portion of the fabric and plane—though the crosses from the wings had already been collared—and a few regimental buttons from his tunic, which we shared out to the mechanic and sergeant with us."

And as though a sequel was necessary to a so unusually daring attack, an enemy pilot, the following day, dropped the following note inside the British lines: "Please give your —— Flying Corps a rest."

The work done by the R.F.C. in the early days of 1916

is ably summed up by Sir Douglas Haig in his dispatch of May 19, 1916:

"In the air there is seldom a day, however bad the weather, when aircraft are not busy reconnoitring, photographing, and observing fire. All this is taking place constantly at any hour of the day or night, and in any part of the line. . . .

"I take this opportunity to bring to notice the admirable work which the Royal Flying Corps has continued to perform, in spite of much unfavourable weather, in carrying out reconnaissance duties, in taking photographs—an important aid to reconnaissance, which has been brought to a high pitch of perfection—and in assisting the work of our artillery by registering targets and locating hostile batteries. In the performance of this work they have flown in weather when no hostile aeroplane ventured out, and they have not hesitated to fly low under fire of the enemy's guns, when their duties made it necessary to do so. They have also carried out a series of bombing raids on hostile aerodromes and points of military importance. A feature of the period under review has been the increased activity of the enemy's aircraft, in suitable weather. But the enemy's activity has been mainly on his own side of the line, and has aimed chiefly at interrupting the work carried out by our machines. In order to carry on the work in spite of this opposition, which was for a time rendered more effective by the appearance in December of a new and more powerful type of enemy machine, it has been necessary to provide an escort to accompany our reconnaissance aeroplanes, and fighting in the air, which was formerly exceptional, has now become an everyday occurrence.

"The observers, no less than the pilots, have done excellent service, and many fine feats have been performed by both. Developments on the technical side of the Air Service have been no less remarkable and satisfactory than the progress made on the purely military side. Much inventive genius has been displayed; and our equipment for photography, wireless telegraphy, bomb-dropping, and offensive action generally has been immensely improved, while great skill has been shown in keeping the flying machines themselves in good flying condition."

CHAPTER XII

THE CAMPAIGN IN EGYPT

The Three Fronts in Egypt—The Beginning of the Contact Patrol—Bombing the Turkish Advance Base—Raid and Counter Raid—The Darfur Campaign—The Fate of "Riddles."

SIGNIFICANT as was the part played by the Royal Flying Corps in the final and complete defeat of the Turkish armies in their ill-planned dash for the Suez Canal and the British territories of the Upper Nile, sufficient emphasis cannot be laid on the fact that in all wars, and especially in all future wars of this guerilla nature, open fighting almost the whole way, the aircraft, and not the infantry or the artillery, must and will prove the dominating factor. It is no exaggeration to say that the aeroplane won the campaign against the Turks in the desert wastes of Sinai and the Holy Land. For that matter, no other theatre of operations in the Great War offered so wide a scope for the employment of aircraft, there being three distinct fronts, the Eastern or Canal line, the fighting on the Tripoli frontier, and the expedition against Ali Dinar, the Sultan of Darfur, whose dominions lay on the southern fringe of the Libyan Desert, and who had taken to raiding on the Kordofan frontier.

The war against Ali Dinar was short, sharp, and extremely severe. Against the Senussi, fighting on the Tripoli borders, but a couple or so British aircraft were employed. Throughout February General Lukin's force was quelling the last remnants of resistance, and pushing close up to the frontier line. On the 26th of that month he defeated the enemy at Agagia, near Barrani, fifty miles east of the border; and with the capture of Sollum and the clearing of the frontier the Senussi campaign virtually ended. While against the Turks, on the Suez front, the British aviators were active throughout the whole year.

Well might that pre-eminently able strategist, Lord Kitchener, in the House of Lords, on January 15, 1916, say that

the much talked of advance of the Turkish forces against Egypt up to the present had failed to materialise. In his own words he supplied the reason of this failure—the most disastrous of any but the last suffered by the forces of the Central Powers during the war: "Certain bodies of Turkish troops, under German officers, have been observed by our aircraft to be attempting to penetrate the country east of the Suez Canal." Whether by night or by day, from that date until the final series of brilliant victories won by General Allenby, British airmen never for an hour lost sight of the Turkish forces.

The R.F.C. did consistently well throughout the campaign, the fate of which the airmen not infrequently carried entirely on their own shoulders. Additional to the constant reconnaissance patrol, against which even the wiles of the Asiatic availed him but little, they bombed his lines and encampments, and harassed his retreat throughout with low altitude machine-gun bombardment. Though the claim to the initiation of the "contact" patrol has already been awarded our gallant French Allies, it may be said that, on a minor scale, attacks, almost similar in their execution and deadliness to the old-fashioned cavalry charge, were made months earlier by British airmen in Egypt. Aircraft not only located the enemy forces, but frequently—with the infantry still many miles in the rear—bombarded his positions, which he was forced to evacuate, and then, swooping low, harassed him with their machine-guns throughout his precipitous retreat. No small part of the ultimate victory also was subscribed to with their invaluable direction of the British heavy guns.

From the first bombardment of El Arish, at El Hamma, and the battles of Moghera and Birsaba, the aircraft ever dominated the battle situation.

Little was revealed here at home of the wonderful doings of our airmen in Egypt. Even the tragedy of poor young "Riddles," lost in the heart of the Libyan Desert, remained unchronicled. One can almost relate in detail the incidents of the air war in Egypt that year and offer news, not history.

Up to the middle of February, then, aeroplane reconnaissance was the only active military operation possible with the British forces, owing to the more immediate necessity of re-

organising the units of the Army and for pushing on the work of laying roads, pipe lines and railways to enable an adequate force to be maintained on and beyond the front lines. On January 20 the enemy was first located by aircraft before Mersa Matru, but a British sortie failed to get to blows with him, owing to the unfavourable weather conditions then prevailing, rainstorms rendering the ground heavy and difficult for the transport.

A Dramatic Moment

On February 2 a reconnaissance was carried out by an officer of the Flying Corps, between 8 A.M. and 4 P.M. of the same day, a distance of over 400 miles from Daba, the railhead of the Mariut Railway to El Gara (about 60 miles north-east of the Siwa Oasis) and back. A fortnight later, in the same locality, a companion pilot, in the course of an aeroplane reconnaissance of the enemy's advanced posts east of the Canal, descended to 600 feet and destroyed the enemy's power station at El Hassana with a 100-lb. bomb. In the first serious encounter of the campaign, at Gâafar, on the 27th of the same month, aeroplanes turned an orderly enemy retreat into an absolute rout. The Turkish column under Nuri and Gaefar had been attacked that morning at Agagia, about fifteen miles south-east of Barrani, by General Lukin's column, consisting of South African troops, Yeomanry and Territorial Artillery. By 3.30 P.M. the enemy had been completely routed, and was fleeing in scattered parties, hotly pursued by the British cavalry, and half an hour later every available aircraft joined in a concerted attack. It was one of the most dramatic moments of the campaign.

Up to the day prior to the attack these same aircraft had convoyed the Turkish troops, like policemen, and it was not difficult to locate his flying columns. Unable to take up any sort of cover in the boundless waste of sand of the Sinai Desert, the enemy troops, even as they fled hot-foot, were mown down like sheep by the machine-guns of the low-flying planes. Here a column of infantry was wiped out from the air; there an artillery team blown sky high with British bombs. In one instance, bombing from a height of over 7,000 feet, one of our

pilots wiped out half a company of infantry marching in close order. Only once did the Turks attempt any sort of a stand. The trap proved futile. Hurriedly "parking" four guns of varying calibre, and later assisted by two others, each harnessed to ten horses and ready limbered, which dashed up at the gallop to the summit of a small hill to their assistance, all were concentrated on a daring British airman overhead. For the moment the latter was forced to abandon the attack, and flew off to his own lines. But a little later he returned with two companions, and within half an hour nothing remained of that venturesome battery than a few shattered fragments and dead and dying artillerymen.

It was always that return attempt which struck such terror into the hearts of the fleeing Turkish troops. Sufficiently demoralising it was to be harried so effectively from the air, but when that same visit could be, and was, repeated two and three times a day, the British airmen returning to their base for fresh supplies of ammunition and bombs, and again and again returning to the attack, no human endurance could stand the strain. Broken, disorganised, demoralised, from Gaafar the Turks fled pell mell, abandoning everything—guns, stores, equipment—on the desert behind them, the cavalry and mounted officers making off at the gallop, while the luckless foot soldier desperately attempted to bury himself in the sand to escape the all-seeing eyes of the British airmen. Had the British High Command but been supplied at the time with aeroplanes as powerful as those already being employed along the Western Front, with the same radius of action, and those machines supplied with the same deadly bombs, the Sinai campaign would have been finished in early 1916, and Beersheba and other Syrian bases alike rendered equally impotent. As it was the Turks for the present retired far out of reach of our aeroplanes.

Resultingly, it was not until March 21 that aviators of the Flying Corps again came into contact with the enemy, and there followed a sharp, decisive period of aerial bombardment. The following day one of our patrols discovered a party of the enemy near El Kubri post, opposite Suez. Shots were exchanged. Aeroplanes estimated the number at about 1,000,

composed of infantry, artillery and a few cavalry. The guns at El Kubri opened fire—directed from the air—and inflicted casualties, whereupon the Turks retired and formed camp eight miles east of the Canal.

A Great Raid

Triumphant as had been the success of the R.F.C. in the recent enemy retreat, they excelled themselves during a brilliant raid on Bir-el-Hassana, the Turkish advance base, on the 26th of the month. The whole scheme was carried out as planned. Four machines were ordered to proceed from one point and two from another, the latter being timed to follow the former flight and complete the destruction which the four machines had begun, and the enemy found that work which had taken months to prepare was destroyed in half an hour. The airmen dropped forty bombs on the reservoir, buildings and trenches with great effect, the description of an observer being that the camp presented the appearance of a volcano in eruption. When the work appeared to be finished a pilot noticed that some infantry were firing on the aviators. He swooped down upon them from behind, and, greatly daring, descended to within 200 feet and opened machine-gun fire, scattering them across the desert. Some officers in a marquee were sent helter-skelter.

The preparations for this comprehensive aerial campaign had been well and thoroughly thought out during the previous winter (1915), in the months of November, December and January, when our High Command was giving its undivided attention to the matter of the systematic development of the naturally strong line of defence. At the same time the detachment of the Royal Flying Corps was organised, staffed with observers, and equipped with accommodation for its planes.

During the first fortnight of January, 1915, the country to the east of the Canal within the radius of our aeroplane reconnaissances remained clear of formed bodies of hostile troops, though frequently visited by Bedouin patrols, which, in some cases, were accompanied by German officers in Arab dress.

On January 18 a hostile force of 8,000-10,000 was located near Bir-es-Saba by a French naval hydro-aeroplane, and on the 22nd a Turkish force was reported to be at Moiya Harab,

having arrived there from Gifgaffa. This was confirmed by aerial reconnaissance the next day, and about the same time reports of the presence of hostile troops at Ain Sadr were received, and our mounted troops obtained touch with hostile patrols near Bir-el-Duweidar.

During the enemy's attempt to cross the Canal in February of the same year, very efficient service had been rendered by a detachment of the Royal Flying Corps, several reconnaissances over the enemy's lines being undertaken during the day.

On February 5 our aeroplanes reported that the enemy were retiring towards Katia, while those who had been in front of No. 2 Section appeared to have concentrated about Gabel Habeita. On the 7th, however, our aeroplanes found this camp deserted. Mabuick was also found to have been vacated, and the nearest enemy on the northern line appeared at Bir-el-Abd.

From information received from British agents and through aerial reconnaissances, it appears that during the month of March (1915) the Turks had concentrated mainly at El Arish and Nekhl, while considerable bodies of the beaten troops were withdrawn to Syria, being, it was rumoured, replaced by fresh formations from the north. On March 22 an infantry patrol moving from Kubri Post encountered a force of some 400 men north-east of that post at dawn. The enemy withdrew on being engaged by troops from the nearest posts, and a subsequent aerial reconnaissance discovered a force of some 800 infantry and 200 mounted men with guns about ten miles east of the Canal. From the report furnished, it appeared that the Turks were entrenching and intended to stay, and, consequently, orders were issued. And these reports were verified later by aeroplane observation, which estimated the hostile force as some 4,000 with guns.

On April 7 an aerial reconnaissance reported considerably fewer numbers retiring through Duweidar. On April 28, later in the day, an aerial reconnaissance located a body of the enemy in bivouac near El Hawawish. At daylight on the 29th an aeroplane found Hawawish evacuated, but later on located the hostile force moving into Mahadat from the south-west, and the cavalry were directed on that place.

In his dispatch, dated Cairo, March 1, 1916, Sir J. G. Maxwell summarises the next ten months' aerial activity with the following:

"Part of 30th Squadron Royal Flying Corps, under the command of Brevet Major S. D. Massy, I.A., with headquarters at Ismailia, carried out daily reconnaissances without a single important accident.

"The French Naval Seaplane detachment, with headquarters at Port Said, under the command of Captain de Vaisseau de l'Escaille, whose services were placed at my disposal for intelligence purposes, was continually employed in reconnoitring the Syrian and Anatolian coast from the requisitioned vessels *Raven* and *Anne*. The results of their work were invaluable. The *Anne* was torpedoed near Smyrna during an armistice while employed by the Royal Navy, but was fortunately able to reach Mudros, where she was patched up and returned to Port Said. I cannot speak too highly of the work of the seaplane detachment. Lengthy land flights are extremely dangerous, yet nothing ever stopped these gallant French aviators from any enterprise. I regret the loss of two of these planes whilst making dangerous land flights over Southern Syria.

"On December 11 . . . meanwhile air reconnaissance disclosed the presence of the enemy in some force at Ras Manaa, about thirteen miles west of Um Rakhum. . . .

"In the meantime the enemy was concentrating in the neighbourhood of Gebel Medwa, about eight miles south-west of Matruh, and by December 24 his strength at that place was estimated from air reconnaissance and other sources to have reached about 5,000 men, of whom more than half were Mahafizia, or regular soldiers, with four guns and some machine-guns, the whole under the command of Gaefar.

. . . On January 19 aerial reconnaissance discovered the presence of a considerable force of the enemy at Hazalin, twenty-five miles south-west of Matruh, the camp comprising at least 100 European and 250 Bedouin tents, including that of the Grand Senussi, which was recognised by Captain Royle, the observer.

". . . On January 22, air reports showing that the enemy's

position at Hazalin was unchanged, the force shown below set out with General Wallace in command, reaching Bir Shola (sixteen miles) after dark, where troops bivouacked for the night. . . .

"The Western Frontier Force also owes much to the Royal Flying Corps, whose work was, as always, of a high order. Special mention should be made of a flight by Lieutenant Van Ryneveld to Qara, by Lieutenant Tipton from the Fayum to Moghara, and regular flights of 200 miles have become quite common."

On February 11, just as the preparations for the British advance along the Canal line were approaching completion, news was received that a native rebel force had concentrated and occupied the Baharia Oasis, which lies some 200 miles south-west of Cairo and about 100 miles from the rich and thickly populated districts of Fayum and Minia. The strength of this force, which was discovered by an air reconnaissance on the day of its arrival, was said to be about 500 men; it was increased on the following day to about 1,000. Further reinforcements were known to have arrived from the west, and the more southerly oasis of Farafra and Dakhla had both been occupied by the 27th.

All this time the oases were kept under constant observation by means of aeroplanes. Very long flights were necessary, and to reduce them as much as possible a system of advanced depots in the desert was started. The credit for originating this system was due to Lieutenant (now Captain) Van Rynefeld, R.F.C., and to Mr. Jennings Bramley, of the Sudan Civil Service, and was first put into practice on the occasion of the flight to Qara.

On the following day, February 20, the hostile forces were located by air reconnaissance at Agagia, some fourteen miles south-east of Barrani. Reports by surrendered Bedouin confirmed the accuracy of the information.

From this date to the time of the next skirmish of any note, which took place along the Suez front on April 22, and culminated with the attack on El Arish, on June 18, the Flying Corps were employed incessantly on bombing expeditions. Between El Kantara and Katia occurred—from the enemy point

of view—a tragedy most gruesome. A covering force of 500 men, left behind the retreat of the main body near Katia to establish a bivouac, was attacked by eight British aeroplanes, which dropped seventy-one bombs on the encampment and absolutely destroyed it. The Turks were taken completely by surprise, and lost half their number killed and wounded. On the 16th inst. three aeroplanes made a flight from the Canal to El Sirr, some twenty-five miles south of El Arish, dropping nine bombs, which were effective. About 150 to 200 tents were observed. The distance flown was more than 170 miles. No other enemy troops were seen this side of El Sirr, though one or two small posts of about twenty men were discovered.

Finishing Touches

Again the Royal Flying Corps put the finishing touches to a skirmish which took place the following two days, when a substantial force of Turks was badly mauled in the Quatia district by infantry and the Australian Light Horse. The aeroplane pilots went after the retreating enemy, dropped bombs among them, and used machine-guns with good effect. When later a report was received that 400 Turks were bivouacking in the neighbourhood of Quatia, the aeroplanes flew back again into the night, and reached Quatia as the sun was rising, and dropped a large number of bombs, completely dispersing the enemy with bombs and machine-guns. The enemy's casualties were observed to be heavy, and he was observed retiring in considerable disorder.

Later the same morning there was hard fighting in the Katia—Quatia—district. Intervening aerial reconnaissance indicated that several hostile parties, of a strength of between 200 and 500, had been assembling in the desert, and were in the neighbourhood of Duweidar (fifteen miles from the Canal), and a strong attack by about 500 of the enemy was made at 5 A.M. on the post held by us at that place. The attack was beaten off after reinforcements had been brought up, and the enemy withdrew, leaving thirty prisoners in our hands. Their known casualties amounted to forty killed. The enemy was harassed during his retreat by a column of Australian troops acting in concert with the aeroplanes, and suffered heavy

casualties both from the fire of the troops and from bombs and machine-gun fire from the aeroplanes.

The next day the R.F.C. reported to No. 3 Section that new bodies of enemy troops were at Bir-el-Bayud, fifteen miles east-south-east of Quatia, and Bir-el-Mageibra, 10 miles south-east of Quatia. The Turks were pursued in their retreat by the 5th Australian Light Horse, who had only arrived at Qartara at 1 P.M., and by the aircraft, thereby suffering further loss.

Aeroplane reconnaissance on the evening of the 23rd established the fact that the enemy force, which included a large body of picked Turkish regular troops, was already retiring. At dawn on the 24th eight machines of the 5th Wing, Royal Flying Corps, made a bomb and machine-gun attack from a low altitude on the enemy troops left in Quatia, causing very heavy casualties and completely destroying the camp. One machine also located and attacked a large body of the enemy at Bir-el-Abd, and located another party retiring on Bir-el-Bayud. On the morning of the 25th further bomb and machine-gun attacks were made by the Royal Flying Corps on enemy forces at Bir-el-Abd and Bir-el-Bayud. Both attacks were extremely successful, working great havoc among men and animals.

"I cannot speak too highly of the admirable work done by the 5th Wing, Royal Flying Corps, during these few days," reported General Sir Archibald Murray, Commander-in-Chief of the Egyptian Expeditionary Force, in his dispatch published in the *London Gazette* on September 26, and dealing with the operations between January 9 and May 31. "The strain thrown on pilots and machines was very heavy, and the former displayed the utmost gallantry and resource on all occasions. Chiefly through their efforts the enemy was made to pay a very high price for his partially successful raid."

On April 24 eight aeroplanes participated in an attack on the enemy camp near Quatia, and succeeded in effecting a complete surprise. The hostile camp was completely destroyed, and the enemy suffered severe casualties from the bombs dropped and from machine-gun fire. The Katia Oasis, except for a force of 1,000 men, who were still established at

Bir-el-Abd (fourteen miles east of Katia), was cleared of the enemy by the 26th. The Turks paid dearly for their raid, as their losses, particularly at Duweidar and as a result of the aeroplane attack, were very heavy.

Raid and Counter-raid

On the 28th hostile aeroplanes dropped bombs on Port Said, but achieved no damage. Early on the same morning eight of our aeroplanes made a bombing attack on the Turkish force at Bir-el-Abd. All the machines returned safely. Later on an attack by British aeroplanes was made on Bir-el-Bayud. The enemy were fired on with bombs and machine-guns from a height of 400 feet with very successful results.

Aerial reconnaissances and skirmishes leading up to the great raid on El Arish, on June 18, may be said to have begun on May 19, when our aeroplanes dropped bombs amongst Turkish reinforcements landing in Ak Bashi Liman, and caused considerable losses. The first bombardment of El Arish occurred on May 18, when the General Officer, Commanding-in-Chief in Egypt reported that our ships, aeroplanes, and seaplanes successfully bombarded this most important post on the enemy line of communications.

The ships bombarded the port to the south-west of the town, and reduced that sector to ruins.

The aerial attack was divided into two phases.

The seaplanes opened the bombardment, being followed later by aeroplanes. The latter were given orders to engage any hostile machines and to devote special attention to the enemy troops and camp.

A column of troops about 1,000 strong were seen south of the town on the march, and three bombs exploded amongst them. All camps were effectively bombarded. And all our machines returned safely.

On May 25, after the enemy's air attack on Port Said, he was allowed little rest by the Royal Flying Corps. Advanced posts at Rodh Salem, El Hamma, Bir Bayud, Bir Salmana and Bir El Mazar were heavily bombed by four of our machines. Forty bombs were dropped and had considerable effect. The buildings and plant at El Hamma were seriously

damaged, while the water tanks at Rodh Salem were smashed by direct bombs.

"This will upset the whole plan of the enemy," reported the War Office official communiqué of May 25, "as since the destruction of drilling plant at Jitjaffa by one of our patrols he has set great store on the waterworks at Rodh Salem.

"During the return journey the pipes leading to the petrol tank of one of our machines was perforated by a bullet. The airman was forced to descend in a wadi beyond our lines, but managed to repair the leak and return safely.

"According to the reports now received it is evident that the column, consisting of troops who suffered heavily from the bomb attack on El Arish by the Royal Flying Corps on May 18, were Germans. This, perhaps, explains their hasty retaliation by dropping bombs on Port Said civilians.

"Further details of the naval bombardment of El Arish on May 18 have been received. Two monitors and sloop took part in the attack, their accurate fire being directed by seaplanes with great effect.

"Altogether thirty-four shells were fired by the heavy guns of the monitors, two of which were observed to hit the hangar on the aerodrome, while most of the remainder burst in the camp amongst the tents, causing the enemy to scatter in all directions."

In the dispatch issued by the War Office, May 26, regarding the fighting in the Soudan, there was the following:

"Before and during the action a valuable air reconnaissance was carried out by an officer of the Royal Flying Corps, who succeeded, by means of bombs and machine-gun fire, in forcing first a large body of hostile cavalry and then a body of some 2,000 infantry to retire in disorder. The officer was himself wounded by a bullet in the thigh, but returned safely to Abiad."

Several air raids of great importance were carried out by our airmen on El Arish (about ninety-five miles east of the Canal). The first of these visits, which was paid on the morning of June 14, included an attack on an enemy camp at Bir Mazar, which was most effectively bombed. A Fokker which attacked our machines was engaged and driven down.

On the morning of June 18 eleven of our aeroplanes left our base on the Suez Canal to carry out a bombing raid on El Arish. The objective was the enemy aerodrome, which had been definitely located the previous week.

The attack took the enemy completely by surprise. When the first of our aeroplanes arrived at 8 A.M. two enemy machines had been run out of their sheds, and in one of them the pilot and observer were already seated preparatory to making their ascent, while a party of seven or eight mechanics were holding on to the wings or standing near the machine. They and the machine were blown to pieces by the first bomb, which was dropped on them from a height of 100 feet.

Our aeroplanes arrived at close intervals and attacked both the hangars and the camp to the north-west of them, with bombs and machine-gun fire at a low altitude, whilst two escorting machines remained in observation at a great height. During the time our aeroplanes were subjected to a very heavy fire from machine- and anti-aircraft guns.

Altogether the raid lasted an hour and five minutes, during which time an open hangar, in which an aeroplane could be seen, was hit and set on fire, and another hangar was seen to be ablaze; several direct hits were obtained on four other hangars; a party of soldiers in the aerodrome was bombed, and several casualties observed. The second enemy machine, which was promptly abandoned by the personnel, was bombed and put out of action; an anti-aircraft gun was directly attacked with bombs; two bombs were dropped in the middle of camp north-west of the aerodrome. Another body of the enemy was attacked with machine-gun fire from a height of 200 feet, in a camp two miles north of the aerodrome, and two bombs were exploded in the town of El Arish.

During the operations one of our pilots was forced to descend in the wadi, two miles north of the enemy aerodrome. His machine was observed to be burning, and it was thought that he set it on fire when he saw that his escape was hopeless. Another pilot, whose aeroplane and engine had been severely hit with shrapnel, reached the coast several miles to the west of El Arish before his engine gave out. He was here discovered by an escorting aeroplane, which landed beside him.

The wrecked aeroplane was destroyed by fire, and after several unsuccessful attempts to rise, the rescuing machine finally got off with its pilot and two passengers, and the return journey of ninety miles was made in safety to our base on the Canal.

In March military events in Egypt took a most dramatic turn. The Turkish threat to our Egyptian and mid-Eastern dominions, which hitherto had constituted a grave menace, came to a head with an attack on the enemy's part on an extended scale; a severe defeat, and an ultimate Turkish retreat which rapidly developed into a rout. As incident succeeded incident and defeat followed defeat in rapid succession, it daily became obvious that, save on the defensive, and in their own territory, the Turkish armies could play no further effective part in this campaign. The British commanders, however, unprovided with the necessary infantry and artillery, and lacking suitable transport, could not follow up this splendid victory with an invasion of the enemy's territory, but were forced to content themselves with conserving their gains. This they proceeded to do in a most systematic manner with wider and more extended employment of aircraft. On the southern front about this same time a reprisal campaign, in which the Flying Corps played a noteworthy part, was commenced against the dominions of Ali Dinar, the Sultan of Darfur, which native monarch, impressed by the temporary Turkish successes, saw fit at this particular moment to rebel against the British Protectorate.

The Darfur Campaign

The campaign throughout proved a miracle of organisation and transport on the part of the British aviation commanders. Despite the almost insurmountable difficulties encountered in the rapid advance, the dangerous influence of the tropic heat on the delicate fabric and framework of the flying machines—never intended for such a climate—the constant danger of explosion with the stored petrol-tins in the constantly shifting bases, the lack of suitable landing-grounds and the woeful shortage of trained mechanics to effect the very necessary repairs, the British aviators figured successfully in every encounter of the Darfur campaign. If the R.F.C. ever adopt

the historic custom of the infantry of carrying colours, those colours will be swamped immediately with the names of a hundred-and-one desperate encounters amidst the arid wastes of Darfur.

In this geographical region the seasons of the year follow one another with amazing regularity. It was known to the British commanders that the weather would break on or about May 25, and so, without undue haste but splendid preparation, it was arranged on March 29 that a flight of the Royal Flying Corps should be detached from the Egyptian Expeditionary Force to take part in the operations in Darfur without delay. On March 31 two officers left Suez for Port Soudan and Khartoum, and they were followed on April 7 by an advance party of a few officers and men with petrol, oil and bombs. The transport organisation of this expedition, as already has been stated and later will be only too well realised, touched an unusual degree of efficiency.

Some 3,000 men, with stores, guns, aeroplanes and other bulky equipment of a modern expeditionary force were conveyed from the base at Khartoum (500 miles by rail from the nearest sea-port) to railhead 428 miles away, and thence across a desolate tract of roadless country for nearly 400 miles. For the aircraft—always delicate and bulky machines to transport—this movement involved a transfer south at very short notice, travel by sea, rail and desert track for 2,000 miles before they could reach the barren spot from which they were to operate; to face all the difficulties of flying under tropical conditions, when in mid-air "bumps" of over 200 feet were frequently encountered, and to fly over a country absolutely unknown to the pilots and where maps were of little use.

As a newspaper correspondent, present throughout the campaign, so truly and graphically describes these particular operations: "The transport difficulties proved greater than anticipated. Stores and machines had to be got forward to Gebel-el-Hilla and Abiad Wells, 300 miles west of the railway, and the track to Nahud, half-way, was quite unreliable, and lorries often stuck fast in the sand for days. The lorries had to take their own supplies of petrol and water, thus reducing the loads.

"Intense heat caused aviation petrol tins to burst, and evaporation was so great that a consignment of seven cases supposed to hold fifty-six gallons contained only thirty-seven gallons. Plants with very sharp, hard thorns grew on the track and punctured tyres, and with the thermometer registering 120 degrees in the shade, it was desperately hard work to get up stores to be ready for the commencement of aerial flights from Hilla by May 12. Most of the transport was done with camels—for at least 150 miles it was impossible to carry stores except in camel packs—and as the tents for machines each required twenty-eight camels to carry them, the labour involved in transport may be imagined."

It was not until the end of May that the forces of the rebellious potentate were subdued at length, and that after the battle at El Fasher. The native troops, though not astonished to see machines in the air, were surprised beyond measure when men alighted from them. One who found speech was heard to say, "The British Government was always great, but now it is greater than ever!" The British pilots very carefully avoided interfering with the native, save in the somewhat humorous instance of the theft of some aeroplane material. A British officer travelling in advance had selected spots for landing-places, and had put down directional arrows of long strips of white cloth. These began to disappear, and the new robes of sheikhs' wives was evidence of the uses to which the pilfered material had been put.

After a strenuous fortnight of guerilla warfare, and when for a few brief hours the British Expeditionary Force was in a perilous situation, an airman returning from a bombing raid on the enemy's camp dropped a message to Colonel Kelly, the commanding officer, stating that there was water in the wells in the country ahead of him and that the enemy had evacuated his positions. This particular airman reached Hilla at 2.15 P.M. on May 21, having been flying for eight hours out of a period of nine, a feat which the Sirdar—General Sir Reginald Wingate—warmly praised in a speech of thanks to the Royal Flying Corps for their magnificent work.

Within a very few days of this date the campaign was ended, and the enemy decisively defeated. At 6 A.M on the

morning of the 22nd, when the troops were about to advance, some hundreds of the enemy to our left flank were dispersed by artillery and Maxim fire and bombed by aeroplane. At 10 A.M. Colonel Kelly, with the mounted troops, entered El Fasher, which was found to be almost deserted except by women.

Sultan Ali Dinar, on receipt of the news of the crushing defeat at Beringia, made a final effort to rally the remainder of his army to the attack in the early morning of the 23rd, and subsequently fled with some 2,000 men, who were bombed as they emerged from the south end of the town by Lieutenant Slessor, R.F.C.

One Aeroplane routs 2,000 Cavalry

Previous to this daring raid, however, as Colonel Kelly was approaching El Fasher, Lieutenant Slessor flew over a long stretch of the Sultan's territory, and arrived over the enemy's capital at the precise moment when our infantry were entering the city. Waiting in reserve, and drawn up behind El Fasher, he discovered 2,000 sabres, and attacked and bombed them forthwith. The horsemen scattered in all directions and fled from the battle. While he was bombing the cavalry, Slessor caught sight of another group surrounding a banner. At this party he aimed a bomb, and narrowly escaped killing the Sultan himself, two of the latter's servants and his own camel being killed by the bomb.

While attacking the cavalry Lieutenant Slessor received a bullet wound in the thigh, and had to manœuvre his machine with his hand instead of his foot on the way back to Hilla, his difficulties being greatly increased by a storm which broke suddenly. He brought the first news of the victory, and it was transmitted to the Sirdar from the aerodrome.

Save for a few isolated cases of aerial activity, and the incident concerning "Riddles"—Second-Lieutenant Stewart Gordon Ridley, who was engaged for some time on the Darfur front—the Egyptian campaign, at least as far as the war in the air was concerned, may be said to have ended with the operations before El Fasher. More than half the month of July passed without any important occurrence on the Eastern

Front. On July 19, however, the situation suddenly changed. A reconnaissance by the Royal Flying Corps revealed the fact that a large enemy force had moved westward from El 'Arish and established itself on the line Bir-el-Abd–Bir Jamail–Bir-Bayud. The average total daily reconnaissances during this period amounted to twenty-three and a half hours, and during the first five days of August to as much as thirty-one and a half hours. Many pilots and observers were out two or three times a day for several consecutive days under very accurate anti-aircraft fire, and were frequently engaged in air combats with enemy machines of superior power.

On August 11 a B.E.2c machine was completing a reconnaissance of the flanks and front of our positions when it was surprised and attacked from above and behind by two hostile machines, the first indication of their presence being the heavy machine-gun fire poured into it from close range. The pilot was shot in the jaw, the shoulder, left hand and left leg. He lost consciousness, but regained it when 500 feet above the ground, and made a landing. The observer was shot in the chest and shoulder. The latter with great effort gave his report when lifted out of the machine and then collapsed. He died of his wounds some hours afterwards. And on November 13 the G.O.C.-in-C. in Egypt reported that two successful air attacks were made on Maghdaba and Birsaba. At Maghdaba the enemy's camp and store sheds were bombed, and a number of direct hits caused much damage. At Birsaba a 100-lb. bomb hit the aerodrome; an Aviatik whilst being brought from the hangar was directly hit, the hangar also being damaged. Bombs were dropped on the railway station, sidings, and rolling stock, which suffered much damage. Two hostile Fokkers were driven down in a damaged condition. Bombs equivalent to a ton of high explosive were dropped during the two raids. All our machines returned safely in spite of very heavy fire from anti-aircraft guns and attacks of enemy aircraft.

The Tragedy of Lieut. Ridley

The tragedy of the desert in which gallant young Ridley lost his life was very fittingly immortalised by some exquisite

lines written by John Drinkwater in the *Saturday Review*, in memory of "Riddles," and the incident afterwards more fully related in the *Morning Post*.

"He landed in Egypt at the beginning of June of this year, and was soon sent down to an oasis in the Libyan Desert. In the middle of the month he went out singly on a machine as escort to another pilot, who had with him a mechanic, named J. A. Garside. The work they had to do was at a considerable distance, and a camel patrol had been sent out in advance to form a temporary landing-place or station, from which they had to operate. They left on Thursday afternoon, June 15, and after flying an hour and a half—half an hour longer than they should—they failed to find the camel patrol.

"As it was getting dark they came down and encamped for the night. The following morning the weather was not very suitable, and Ridley, having the light machine, suggested that he should try to find the proper track of the camel patrol. It was, however, found that his engine would not work. It had been giving him trouble the previous afternoon.

"The other pilot then decided that it was necessary that he should go back at once to the base (leaving his water and provisions) and find the exact position of the landing ground. He arranged that he should return on the following day (Saturday) and take Ridley and the mechanic (Garside) separately to the landing ground. He got back to the base, and found that, as the aviators had not turned up, the camel patrol had returned to the base. The pilot and the captain of the Camel Corps returned to the landing ground, and on the following morning (Saturday) the pilot began a search for the other two.

After some time he reached the place where he had left them, but the mechanic (Garside) and Ridley had gone. They left some odds and ends behind them, but no note. The pilot and his companion returned immediately to the base, and when it was ascertained that Ridley and Garside had not come back, search parties, consisting of camel patrols, motor-cars and aeroplanes were at once sent out.

"Nothing was discovered until the Sunday afternoon, when, twenty-five miles away from the spot where the first night had

been spent, a second place was found. There the missing ones had landed, but they had again flown on after having patched up the machine. On the Tuesday afternoon the machine and two dead bodies were found by a motor party. During the search the pilot came across the footprints of two men walking. These were overtaken by a hostile camel patrol, and for a time it was thought and hoped that Ridley and Garside had been captured.

"It was, however, found that Stewart G. Ridley shot himself at half-past ten on the Sunday night. The captain of the Imperial Camel Corps said that from what he discovered he formed the opinion that Ridley had done this in the hope of saving the mechanic, and the commanding officer of the R.F.C. also states: 'There is no doubt in my mind that he did this act of self-sacrifice in the hope of saving the other man.'

"After Ridley died Garside had kept a rough diary, of which the following is a copy:

"'Friday.—Mr. Gardiner left for Meneriq, and said he would come and pick one of us up. After he went we tried to get the machine going, and succeeded in flying for about twenty-five minutes. Engine then gave out. We tinkered engine up again, succeeded in flying about five miles next day (Saturday), but engine ran short of petrol.

"'Sunday.—After trying to get engine started, but could not manage it owing to weakness, water running short—only half a bottle—Mr. Ridley suggested walking up to the hills. Six P.M. (Sunday): Found it was further than we thought; got there eventually; very done up. No luck. Walked back; hardly any water, about a spoonful. Mr. Ridley shot himself at 10.30 on Sunday whilst my back was turned. No water all day; don't know how to go on; got one Very light; dozed all day, feeling very weak; wish someone would come; cannot last much longer.

"'Monday.—Thought of water in compass, got half-bottle; seems to be some kind of spirit.* Can last another day. Fired Lewis gun, about four rounds; shall fire my Very light to-

* Air compasses are of the "floating" type, the card swimming on the top of a specially prepared liquid.

night; last hope without machine comes. Could last days if had water.'

"A party with a chaplain went out on Sunday, June 25, and buried the two in the desert, and erected a cross with their names on it over the heap of stones covering the bodies.

"On his father's side Ridley came of a well-known Northumbrian family, or clan, and the name of his residence, Willimoteswick, takes one back to that old fortified farmhouse in Northumberland where was born Bishop Ridley, who with Latimer at Oxford 'played the man.' His mother was born in Derry, where her own mother belonged. To this city Lieutenant Ridley's maternal grandfather had come some years before from Newton Stewart, in Galloway."

CHAPTER XIII

THE REORGANISATION OF THE GERMAN AIR SERVICE

The Kaiser Showers Honours on his Flyers—The Death of Immelmann—Enemy Exaggerations—German Reconstruction—New Types—Sea-plane Raids.

GERMAN ACES (1916)

Name	Number Victories
Captain Boelke*	38
Lieutenant Immelmann*	15
Lieutenant Frankl	14
Lieutenant Wintgens	11
Lieutenant Hohndorf	10
Lieutenant Parchau*	8
Lieutenant Mulzer*	8
Lieutenant Baron von Althans	8
Lieutenant Leffers	5
Lieutenant Berthold	5
Lieutenant Walz	4
Lieutenant Cerlish	4
Lieutenant Baldamus	4

* Killed in 1916.

It is pleasant to be able to write of at least one unit of the German forces that they were generally above mean tricks and the slaughter of helpless non-combatants and innocent women and children. Apart from the squadrons told off exclusively to raid England, the German air service squadrons, engaged along the Western Front, were influenced greatly by the leadership of certain world-famous airmen. These were the enemy "aces," Boelke, Immelmann, and later von Richthofen, who was even now training under Boelke's leadership. It was more at the instigation of the German Government, for propaganda purposes in neutral countries, than at the personal wish

of the individuals concerned, that they were accorded the theatrical advertisement in the enemy official communiqués. For the average German "ace," it may be said, as the R.F.C. said of Boelke after his death, he was "a brave and chivalrous enemy."

Greatly favoured by the authorities, no fewer than four of these "aces" were honoured with the Order Pour le Mérite, the most exclusive German decoration. Early in the year both Boelke and Immelmann received the Order, and the former was promoted to the rank of captain in May in recognition of his great services. On the 6th of the same month, it was officially reported of Sergeant Frankl, who that day brought down his fourth English biplane, that "His Majesty the Kaiser has given expression to his appreciation of the achievements of this capable aviator by promoting him to the rank of an officer." Before the end of the year Lieutenant Frankl was reported to have brought down his eleventh Allied aeroplane. For his splendid achievements in an air fight on June 30, when he shot down a French biplane south-west of Chateau-Salins, it was announced in the German official of July 1 that the Kaiser had conferred the Order Pour le Mérite on Lieutenant Wintgens, and within a week of receiving the same distinction, Lieutenant Parchau was killed in a fight with a British machine on July 24, being shot through the heart; his machine falling into the German lines.

The German Air Fighter Improves

This official interest was not without its effect on the moral and general efficiency of the German air service. As an airman began to distinguish himself in aerial combats he was appointed second, and later in command of a battle squadron. The pick of the aviators were appointed to command the new "circuses." Formed principally for chaser-patrol work, guarding reconnaissance and slower bombing and photography machines above the clouds, the "circus" would hover over their own lines until a solitary British plane came into sight below. Two or three of the less experienced pilots would then drop down from the formation and surround our man. While he was thus hotly engaged, in one sharp dive, the leader of

the enemy pack would swoop down on to his back, and shoot him to earth before he had time to turn round. In this form of attack there was great rivalry, squadrons and circuses competing in heated fervour to claim the greatest total of enemy —Allied—machines brought down. No less strenuous was the competition between the individual leaders.

Almost daily it was possible to follow their progress in the communiqués, and the race waxed fast and furious. By March 15 Boelke and Immelmann had scored eleven and ten victories respectively; Boelke bringing down two machines that day behind the French lines. Lieutenant von Althans shot down his fourth enemy aeroplane on the 20th of the same month; the same day that Boelke claimed his round dozen. Ten days later the scores stood, Boelke thirteen, Immelmann twelve; the later total being secured at the expense of another British biplane. Berthold brought down his fifth machine—another British biplane—on April 17. Boelke shot down his fifteenth and Baron von Althans his fifth on May 2. In August the German War Office officially announced the scores of the principal "aces" as follows: Captain Boelke, 22; Lieutenant Immelmann, 15; Lieutenant Wintgens, 11; Lieutenant Hohnsdorf, 10; and Herr Lieutenants Parchau, Mulzer, and Baron von Althans, 8 apiece. By the middle of September, Boelke had achieved his twenty-third, and three new "aces" had appeared upon the scene in the persons of Lieutenants Leffers, Eahlbusch, and Rosencrantz. Between these four aviators in a single day—September 3—were claimed no less than fifteen victories over Allied pilots. Within a month of this date Boelke was brought down and killed by a French airman, Flight Adjutant Roger Rebiere, on the Verdun front; Lieutenant Parchau being killed a week previous to his great leader. The death of another "ace," Lieutenant Mulzer, who was killed in France, was observed with all the old-fashioned pomp and ceremonies of the historic "Trauerfeier"—the coffin with the body of the dead airman being placed on a plinth between four stone pillars on which were placed burning torches.

Of Boelke, whom the Kaiser described as "my bravest and most successful air officer," the following characteristic story was narrated in the *Lokalanzeiger* by an eye-witness:

Two British battle aeroplanes, subjected to the fire of the German artillery, attempted to escape, but only one succeeded. Suddenly a small German monoplane appeared, which attacked the enemy at a height of 3,000 feet. After an exciting combat, fought by both with equal bravery, the German aeroplane, attacking from the front, forced the enemy to land. The German machine also landed, and its pilot rushed to the British aeroplane and shook hands with both the British officers, who were wounded, the pilot slightly in the head, and the observer three times in the shoulder. The British pilot, who spoke German fluently, declared, after realising that he was a prisoner: "I am not ashamed, since Immelmann has defeated us." Whereupon the German replied: "Well, this time it is only Boelke."

The End of Boelke

Captain Boelke was buried with full military honours, after a special service held at Cambrai Cathedral on October 31. Among the wreaths, according to the *Lokalanzeiger*, was one inscribed, "From the British officers who are prisoners of war at Osnabruck. October 28, 1916." Later, on November 10, a British aviator dropped over the German lines a wreath and a letter, which were afterwards forwarded to Boelke's parents in Germany. The letter read as follows: "To the officers of the German Flying Corps at this front. We hope you will find this wreath. We regret that it comes so late, but the weather prevented us from sending it earlier. We mourn with his relatives and friends. We all acknowledge his bravery. Please remember the Morane Squadron to Captain Evans and Lieutenant Long." In a letter dated October 24 and published in the *Cologne Gazette*, Boelke had written: "Here, on the Somme, is the real airman's El Dorado. When the weather is in any way fine the whole sky is full of Englishmen."

On July 11, Immelmann flew out to his death. Two other Fokker scouts went with him. As by custom they hovered waiting behind their lines at 13,000 feet. A lone British plane was sighted—that of Lieutenant Savage bound on a routine patrol. One after the other the two Fokker pilots dived at Lieutenant Savage, while, as was his settled plan, Immelmann

waited above the clouds, out of sight, for the right moment to plunge down on the Englishman's back unawares, while he was desperately engaged against his two companions; like a matador administering the *coup de grâce* to the wounded bull. This plan of attack had proved infallible. The enemy airman, like a rat in a trap, was helpless; Immelmann, flushed with his recent successes, overlooked even elementary precautions. Imagining the Englishman to be single-handed, he dived at him direct without troubling to look for a possible companion. The story and the incident of it are McCudden's thereafter. For it was Lieutenant "Jimmy" McCudden, then a beginner, but later one of our greatest fliers, who bagged him.

The great Englishman sighted the three Fokker machines when he was some 8,000 feet up, and the Fokkers at 13,000. McCudden's business was to go for what he saw; and it was two of the Fokkers, which were dropping, like hawks after their prey, on his comrade's machine.

Meanwhile, as the story is related by an eye-witness: "Lieutenant Savage also dived to avoid the first rush of the two attackers, so that the actual fight took place at about 5,500 feet; and down at one sheer drop for 2,500 feet went 'McC.' to join in. It is a dizzying thing even to think of, the two birds of prey plunging through the almost illimitable space on the quarry below, and 'McC.' sweeping after them to his comrade's help. As he drew near he saw that he was already too late to bring help; only retribution remained. As he dropped he saw Lieutenant Savage's machine get out of control and then go plumb down to earth. Evidently the pilot himself had been shot from the foremost of the two Fokkers which had dived straight down for the tail of the British machine. 'McC.' followed no less straight. Before Immelmann had begun to steady himself from his victorious plunge 'McC.' was on him. He took no chance of firing from a safe distance, but went straight in, confident in his observer's nerve, and it was not until he was almost touching the other machine that 'W.' fired. At the very first round the enemy was hit. The machine seemed suddenly to bank, turned clean over on its right side, and then went down like a stone.

"Meanwhile the second Fokker had swung round, and in its

turn was coming for 'McC.' The latter swerved, and circled to get inside the enemy, but no shot was exchanged. 'McC.' did not know who was in the machine which had fallen. Doubtless the occupant of the other Fokker did; and, knowing that Immelmann was gone, either had not the heart or the nerve to continue the fight, so he dropped down after his lost comrade."

So far as the German madness was never without method, their elaborate schemes of "aces" formed a vital part in the reorganisation of the enemy air services. Gradually creeping up in the matter of aircraft production, their pilots excelling in combat, during the long winter months of 1916-17 the Allies almost drove the German aviators from the skies. Among twenty-three Prussian casualty lists, Nos. 419-442, were included twenty-four aviators killed and eleven wounded in a single month. Eighteen others were given as prisoners in the hands of the Allies and two as interned in Holland, through an involuntary landing. The very general demoralisation which had set in was perhaps best described in the words of one of their own officers. This information, outlined in the form of a personal diary—altogether a remarkable document—was taken from the person of a German officer who was captured by the British infantry, and read as follows:

"*August* 1.—Our aviators are ——. None of them show themselves above our lines.

"*August* 2.—The French aviators fly about 600 feet above our lines, while none of ours put in an appearance. We cannot fire on them without immediately attracting heavy artillery. We have, therefore, to remain in our trenches, where it is as hot as ever, dying of thirst, and waiting to be killed or buried by shells.

"*August* 3.—The French use nothing but heavy guns, and have been bombarding us all day, their fire control being beyond reproach as the result of the action of their aviators; but ours still keep out of sight. The French aviators are masters of the air.

"*August* 6.—The value of our aviators is so small that even far behind the lines they are not masters of the field. Generally our aviators are far from being as good as the French

or English, and consequently we do not dare to move a step outside our leaf-covered shelters. Enemy aviators keep circling round the wood we are in and signalling our presence. Whether we like to recognise it or not, it is evident from this point of view we are inferior. We are told that Germany is holding her own in the air, but it is no use telling us that, and that is why we have these enormous losses. There is absolutely no one to drive away these parasites that give us no respite from dawn till night. The moral effect on us all is as bad as it can be. Final success, however, depends on the co-ordination of all available arms, and that is what is wanting here. The situation is the more astonishing because of the large number of French aeroplanes we bring down.

"*August* 12.—Enemy aviators flying at 100 metres took part in the fighting with machine-guns. Some of our men were wounded in the head by bullets from above."

This unfortunate condition on the enemy's part was further aggravated by the general military situation. With Russia still holding out on the Eastern Front, and renewed calls for aerial reserves and supplies from her ever necessitous Allies, Bulgaria and Turkey, the enemy air force on the Western Front—the hardest-fought corner of the air war—was reduced to a bare modicum. The German commanders were forced to economise in their aircraft operations, while at the same time endeavouring to meet the new demands of a far wider sphere of activity. For this purpose, the need of a thorough reorganisation of the German air services waxed urgent. And this was carried out immediately and with characteristic thoroughness.

The influence of the new school of "aces," it will be seen, before the close of the year, had more than restored the fallen moral of the enemy aviators. In this ascendancy, too, an amazing development of new and considerably faster machines played no small part. In March it was announced from Berlin that the increasing importance of aerial warfare had made it necessary to combine, under one department, the entire German aerial and anti-aircraft forces of the army, both at home and in the field. At the same time, the new Corps was placed under the command of Von Hoeppner, one of the most brilliant of Hindenburg's younger generals. Meanwhile, as this new

development was going forward, to hold the line the enemy fell back on his usual resource of a general campaign of bluff.

After making a very necessary and belated apology to the Dutch Government for a Zeppelin commander who accidentally had dropped bombs on Dutch soil, the Germans commenced a hitherto unprecedented campaign of lying propaganda. The construction of the new machines, meanwhile, went on merrily apace. Part of the propaganda scheme was for home consumption, while the finer imaginative efforts were reserved exclusively for Germany's "innocent" friends abroad.

A Mythical German Seaplane

The first of these mythical claims was that relating to a certain German seaplane squadron which had successfully bombed English naval forces off the coast of Flanders, October 21, and had sunk one of our destroyers. Unfortunately for the Germans, this statement was denied by the British Admiralty within twenty-four hours of its publication. However, opportunity soon presented itself to the enemy propagandists, with the disastrous raids on England by German Zeppelins, on September 23 and October 2 respectively. A most circumstantial report—obviously from an official source—concerning the alleged gigantic damage caused to English towns, was printed throughout the German press. According to this account, in the raid of September 23, a hundred houses valued at £2,000,000 were reduced to heaps of ruins. Regent Street completely collapsed. An ammunition factory in South London was destroyed. Liverpool Street Station railway bridge and lines were so damaged that repairs would take some considerable time. And the Underground line to Piccadilly was closed for three days. The second raid, that of October 2, according to the enemy, proved even more propitious.

The German claims on this occasion, however, were so exaggerated and so impossible that even the British Press Bureau was moved to protest, and issued an official denial. In this denial it was stated that the enemy claims were nothing less than "ludicrous fiction." At the same time, the Secretary of the Admiralty stated that there was not a word of truth in another German assertion that: "A four-funnelled cruiser and

two or more warships were damaged, and that sixty men were killed on board the four-funnelled cruiser in the Humber." It might be remarked that on this occasion the enemy's modest claims embraced an area from, approximately, Grimsby to the south of London, including every point of importance on the East Coast. In the London Metropolis, it was stated, twenty houses were damaged and over 200 families rendered destitute. According to the same report, at Thameshaven benzol tanks were greatly damaged, and storehouses destroyed. At Grimsby barracks were hit, and over 400 soldiers killed. While at Leeds great havoc was achieved among ammunition factories, railways, and railway stations.

These absurd fabrications—incredible as now it may seem—lasted for several months, until Germany slowly began to realise that she was making herself the laughing stock of the world. To be just, once she was aware of the fact, she turned to, and carried out her more substantial reforms in real earnest.

Reconstructive Policy

In this general reconstruction plan, no phase of the war in the air, however insignificant, was disregarded; the organisation was well-nigh perfect. An admirable plan of general attack was developed, whereby from aerial bases, situated in the captured Belgian territory, an incessant series of air-raids was carried out on the British Isles; and from these bases, at the same time, the battle aircraft fulfilled the usual routine duties—of combat, bombing, reconnaissance, and the direction of artillery fire along the Western Front. By so doing, the enemy reduced his construction and transport difficulties by quite 50 per cent., and at the same time increased his general efficiency by almost 100 per cent. It was the finest aerial strategic victory of the war, and to a certain extent explains the later difficulties which British airmen encountered in driving the enemy aircraft from the skies over the occupied territories.

The problem of attack at this time, however, did not occupy his undivided attention. To protect his homeland from the daily, more extensive Allied raids, new anti-aircraft guns, more accurate and with a more widely extended range of fire, were rapidly developed. At the same time, German

constructors were making great headway with their new types of machines, and had improved upon even the much-vaunted Fokker before the summer was far advanced. The Zeppelin raiding campaign was almost at an end, the giant airship already a discredited vessel of war; but their general value had no whit decreased in popular estimation. As gradually and reluctantly the German High Command began to realise this unsuitability, they were rapidly superseded by long-range and powerful engined aeroplanes, considerably more formidable to the Allies in this respect, while his innumerable activities along the fighting front were chronicled throughout the year with the customary and inevitable bombastic official reports.

Germany's Anti-Aircraft Effort

For purposes of defence against air-raids and for battery work against hostile aircraft behind the German lines, the enemy's tendency now was to greatly increase the size of his anti-aircraft guns. With the new German 5-inch guns, according to reliable French reports from their spies inside the enemy lines and reports of personal experiences of their battle pilots, this gun possessed a useful range of 8½ miles. At that altitude, moreover, instances were on record of Allied machines being placed *hors de combat* by the German incendiary anti-aircraft shells. No less remarkable was the immediate development of the German aircraft.

A new machine, or machines, had been designed during the winter of 1915-16 for every branch of aircraft activity. These same new types were experimented with in the spring, and by midsummer were in active operation over the firing lines. The better known types of these new craft were the Albatross, a new and speedy fighting-scout, intended for chaser-patrol work; the Roland, the first war aeroplane with an enclosed fuselage, an excellent reconnaissance machine; the new Fokker biplane, which soon superseded the original monoplane type and proved an excellent fighting machine; and the Halberstadt, soon to become famous by reason of its innumerable raids on London and the East Coast. On the Russian Front, at the same time, appeared a new German battleplane, dissimilar in every respect

to every previous known type of enemy aeroplane, which was reported to be painted entirely black, possessed of considerable size, and a speed of over 112 m.p.h.; which flew regardless of wind and weather, and never at an altitude of less than 10,800 feet.

New Types of German Machines

The three most valuable new types of enemy planes were undoubtedly the new tractor biplane, the efficient low-powered triplane, and the enclosed monoplane and biplane. The tendency in design of all these types was to decrease the wing-span, so that the machines presented an unusually stunted appearance beside the larger British and French biplanes of unusually wide span; and to get back more and more to the natural lines of the bird, a feature for which almost every type of German aeroplane was famous. It must be admitted that this year the German constructors evinced considerably more ingenuity and progressiveness than did their contemporaries of the Allied Powers.

Regarding the new types in detail, the latest Fokker biplane was almost similar in design to the now antedated Fokker monoplane, except that the wings were much straighter in line, while a characteristic feature, peculiar to the period, was the small gap between the upper and the lower planes of the wings. The fuselage of the Fokker biplane, which was hexagonal in section, flattened out to a horizontal knife-edge at the tail. The machine-gun on board fired through the revolutions of the propeller, and the engine was an Oberursel monosoupape, which drove a Garuda propeller.

Though in the enclosed type of Roland biplane the view of the observer and the range of the machine-gunner was considerably restricted, for winter flying this type possessed many advantages. It was a peculiar machine as being a great departure from the usual track of German design. The fuselage was as deep as the gap between the main planes, the top one of which was actually attached to the upper longerons and the bottom planes secured to the lower longerons in the usual way.

The seats in the body of the Roland, or L.F.G., as it was sometimes called, were arranged in tandem, the gunner sitting behind the pilot; small windows in the fuselage being placed

beside either seat, thus enabling the pilot and observer to obtain their view and sight their guns. The engine was a 160-h.p. Mercédès, which climbed 1,500 feet in 4 minutes, 3,000 feet in 8 minutes, 4,500 feet in 14 minutes, and 6,000 feet in 22 minutes. The Halberstadt biplane, the famous bombing machine, was a slightly slower type, the fuselage of which was built without internal cross-bracing, the necessary rigidity being obtained by covering it with three-ply wood. It was driven by a 120-h.p. Argus motor. The Albatross single-seater scout, which was nicknamed the "German-Spad," after the famous French machine from which the German design had been borrowed, was driven by a large water-cooled stationary engine, fitted in a fuselage of the *monocoque* type. Analogous improvements were effected during 1916 on the enemy lighter-than-air craft.

Though the Zeppelin raiding campaign this year was only a mere shadow of its former military usefulness, and was continued more for its moral effect on the German population, the German Zeppelin factories, which had been enormously enlarged since the outbreak of the war, were turning out one new ship a week. This latest type of enemy airship was a super-Zeppelin, of which the finest example was the L.Z. 77, later brought down by anti-aircraft fire near Longwy, in France. In this type the German designers had combined and embodied the finer points of the Zeppelins, together with the streamline form of the "Schutte-Lanz," a large airship with a wooden framework. As may be seen from the following table, this was an important advance in rigid airship construction; the dimensions of the earlier war types of Zeppelins being as follow:

Type	*Cubic metres*	*Length, metres*	*Diameter, metres*
1912 ..	19,500 ..	141 ..	14.80
1913 ..	22,000 ..	156 ..	14.80
1914 ..	27,000 ..	158 ..	16.58
1915 ..	30,000 ..	160 ..	—

Up to the time of the L.Z. 77 all Zeppelins were symmetrical —that is to say, both ends were alike. The new ship, like British and French airships, was much bulkier forward, and tapered off towards the stern, which gave her, with an equal

capacity, less resistance when advancing, and, consequently, with equal power, greater speed. The L.Z. 77 carried two cars, which the Germans first called "gondolas," a kind of metal boat, in which were placed the motors and the mechanics. They communicated by means of a central cabin, in which were stationed the pilots, the crew, and the bomb-dropping parties. The wireless telegraph apparatus was in the same place as the bombs. A central ladder led from there vertically through the Zeppelin to the upper part, which was provided with a platform, or shield, whence machine-guns could be fired. This ladder passed beween two of the twenty independent ballonets, separated by partitions, which in a Zeppelin correspond to the watertight compartments of a ship.

The L.Z. 77 was provided with five engines of the same type as those of previous airships—Maybach, of the type known as 180-200 h.p., with six vertical cylinders of 160 by 170, water-cooled, weighing 448 kilogrammes, and consuming about 230 grammes of petrol per horse-power, and 2,500 grammes of oil per hour, and per motor. The Maybach factory was situated at Friedrichshaven. The engineer Maybach was the technical director and founder, with Herr Daimler, of the Mercédès factory.

In the summer of 1916 Germany was in the possession of some forty Zeppelins, the greater number of which were destined for patrol service over the North Sea and the Baltic, in constant communication with her fleet and her submarines. They thus policed the seas and kept a watch on ships of commerce. That was the principal task of the Zeppelins.

The chief Zeppelin pilot's school was situated at Leipzig, near the old shed. There were, by this time, three new sheds and two schools : one for artillery officers (Army dirigibles), and the other for naval officers (marine dirigibles). Leipzig was, as a matter of fact, geographically protected from all incursions of aeroplanes from France, Belgium, the sea, or Russia. It was also the centre for making hydrogen (Chemnitz factory), and for airship fittings (Zeiss factory at Jena). Finally, it stood at the meeting point of three aerial routes which cross Germany, and which were indicated by hangars and aerial lighthouses : Route to the Western front, by Leipzig, Gotha, Frankfurt,

Mayence, Metz, and France, or by the valley of the Rhine, Cologne, Aix-la-Chapelle, and Belgium; route by the sea, by Cuxhaven, Hamburg, and Kiel, and the hangars of Schleswig; route to the Eastern Front, by Berlin, Posen, Leignitz, Königsberg, to mention only a few of the principal sheds.

Almost as the swan-song of that disastrous Zeppelin campaign was the anonymous cablegram which appeared in the *New York 'World* on August 5, and after that came the end. "The third great aerial attack on England," ran this message, "has been made within seven days. It took place last Wednesday night. The Zeppelin fleet included two new Zeppelin giants, which are the last word in Germany's aerial cruisers. . . . On this last trip they carried an enormous quantity of shells, and covered a distance of 237½ miles in two hours."

It has been said that the Zeppelin raids were continued more for the sake of the moral of the German people than with any idea of a military objective. The poorer classes in the enemy's country, almost pathetically, still clung to the idea that their great airships were invincible, and that ultimately by this means Hindenburg would be able to land a large invading army of thousands of men on British shores. Almost childish in their worship of their War God, they were as easily blinded to the real issues of the war when choice and circumstance led their High Command to furnish them with further accounts of glorious victories achieved on the land, at sea, and in the air. This was a critical time for Germany in the war. The summer of 1916 saw the Allies growing daily more numerous and efficient; the Central Powers, on the other hand, were beginning to show signs of demoralisation. To disavow the much-vaunted Zeppelin campaign at such a time would for the enemy have proved disastrous. His lying propaganda already was beginning to recoil against his own head. The stage management of the enemy High Command that cleared the Germans from this impasse was little short of wonderful. While gradually the number of Zeppelin raids on England was decreased, as gradually they were superseded by a larger number of, and more frequent, seaplane and aeroplane expeditions, with far greater success and satisfaction to themselves. At the same time the enemy enormously increased his effort on the Western

Front, the official reports of which, though on occasions grossly exaggerated, were on the whole fairly accurate.

The following were the principal raids of this new campaign against Britain in 1916, in which German seaplanes first played an important part; (*a*) is an aeroplane, (*s*) a seaplane raid.

Date	*Objective*	*Killed*	*Injured*
Jan. 23.	(*s*) East coast of Kent	1 ..	6
Feb. 20.	(*s*) Lowestoft and Walmer ..	1 ..	1
March 1.	(*s*) South-east coast	1 ..	—
,, 19.	(*s*) East Kent, Dover and Ramsgate	9 ..	31
April 24.	(*s*) Dover and Deal	— ..	—
May 3.	(*s*) Deal	— ..	1
,, 20.	(*s*) East coast of Kent	— ..	2
Sept. 22.	(*s*) Dover	— ..	—
Oct. 22.	(*a*) Sheerness	— ..	—
,, 23.	(*a*) Margate	— ..	—
Nov. 28.	(*a*) London	— ..	—

For some time before it had been anticipated that the enemy might attempt to raid London by aeroplane. He was certainly possessed of suitable machines, the only question was whether his pilots had sufficient moral courage. The daring stranger who, running the gauntlet of all the concerted British anti-aircraft defences along the south-east coast, paved the way to a long series of, from our point of view, disastrous raids, of which the daylight visit of the following year was the crowning ignominy. Though this raiding pilot afterwards was brought down and captured in France, and a previous enemy raiding machine, on October 22, had been destroyed by a British seaplane, the momentary success of the London raid of November was sufficient to convince the German High Command of the possibilities of this new weapon of war. Aeroplane raids on England followed on every suitable day, without exception. With amazing cleverness the German had once again turned the tide of fortune of the air-war to his own ends.

Where, along the Western Front, the enemy engaged in a wordy warfare over a statement which had been made in the British House of Commons, to the effect that, only seven of his

machines had been shot down in aerial combat since the previous October to a total of forty-one British in February, he claimed unusual activity on the part of his battle aircraft, and the number of his far-reaching reconnoitring and nocturnal squadron expeditions behind the enemy front were considerably greater than ever before. The German losses during the month of February, according to his own account, amounted to none in aerial battles, none being shot from the ground, six missing. Total, six. "The French and English have lost thirteen in aerial battles, five by being shot from the earth, three by forced landings within our lines. A total of twenty-one."

In April, again, and throughout the chapter we quote from the enemy official messages, aerial fighting greatly developed with increased bitterness, especially in the second half of the month, on the Western front. In place of single combats, fighting continued in groups and squadrons. These battles were, for the greater part, fought to a finish on the Allies' side of the line (!) In the course of these battles on the Western Front twenty-six Allied aeroplanes were brought down by German battle airmen during April; in addition to these ten aeroplanes succumbed to the fire of German anti-aircraft guns. The German losses, on the other hand, amounted altogether to twenty-two aeroplanes. Of these, fourteen were lost through aerial battles, four through not returning, and four through being shot down from the earth.

In spite of the generally unfavourable weather great successes were obtained during November by the German air service, ninety-four Allied machines falling to their bag.

It should be noted that there was a very considerable element of exaggeration in all the above-quoted enemy reports.

CHAPTER XIV

ITALIAN CAMPAIGN

The Italian Aerial Campaign—The Hydroplane Service—Italian Airships—a Disaster—Austrian Vandal Raids on Venice—Other Enemy Raids—The Pope Protests against Them—The Caproni Machine in Action—A Brilliant Finish to a Successful Year.

FROM the time of Parenzo, and the Italian seaplane raid on that Austrian naval base early in June, until September 14, 1916, when a Caproni bombing-squadron spread death and destruction in Lloyd's arsenal in Trieste, the aerial war over the Eastern Alps waxed fast and furious, and without lapse. Characteristic of the hard-fought campaign were the performances put up by the Italian semi-rigid airships, which carried out innumerable raids across the Adriatic in the face of the most formidable opposition in the shape of powerfully armed enemy anti-aircraft defences. One of the marvels of aviation in the war, the Caproni aeroplane, the huge Italian bombing machine, carried the air-war far inland, effecting countless invaluable bombardments on military positions, arsenals, and encampments. The series of vandal raids carried out by the Austrian airmen on the defenceless city of Venice was the only marring element of an unusually spirited campaign.

The air-war along this front may be said to have commenced with the Austrian concerted attack in March, 1916. This enemy offensive was preceded by air raids organised on a large scale, the last of which was intended to be a strategic operation of the first importance. It failed completely, but was not without adventurous incident.

The objectives of the raid were the Italian communications in the rear of the armies, and particularly the railway and road bridges across the Adige, Piave, Livenza, and Tagliamento, on the routes leading to the frontier. Moreover, the Austrians planned to bombard some of the most exposed Italian towns.

Early on March 27 strong enemy air squadrons left four aerodromes well within their lines.

The same morning a group of Austrian airmen flew over the plain between the Isonzo and the Piave, again with the object of damaging the Italian lines of communication. However, the accurate fire of the Italian anti-aircraft guns not only drove off the attack, but succeeded in bringing down three of the enemy aeroplanes.

Meanwhile, an Austrian squadron, consisting of six machines, had set out from Gardolo, with the intention of bombarding the bridges on the Adige, but turned aside to attack Verona, and two more squadrons left Aisovizza, some flying over the Adriatic and then turning north into Venetian territory, and others heading direct for the district of Piave, Treviso, and Cervignano.

Altogether eighteen bombs were dropped by the squadron from Gardolo, over Verona. An alarm was given, and the Italian batteries kept the raiders at such a distance that only five people were injured and a few buildings damaged. The enemy aircraft withdrew, abandoning the task assigned to them.

Another squadron of six machines, from Pergine, flew towards the bridges over the Piave and Meduna, and succeeded in dropping fifty bombs on the Priula Bridge (Piave), in addition to four on Pordenone. This same squadron, late that morning, appeared circling over Susegana, dropping bombs haphazard over the quiet landscape, without doing any damage. Then the Italian anti-aircraft guns got into action, and soon one of the enemy aeroplanes fluttered helplessly, and came to earth by a railway station. The occupants, two Austrian officers, hurriedly destroyed it, causing a bomb to explode, and then they tried to escape across country, entering houses here and there, threatening the inhabitants with revolvers, and trying to obtain civilian disguises. They were overtaken, however, and as they showed fight an Italian officer fired a shot into the air, whereupon one Austrian surrendered, whilst the other continued his flight. Being, however, also overtaken he drew out a revolver and threatened to shoot, when an athletic Territorial resolutely pounced on him, threw him down and disarmed him.

Another Albatros machine of this squadron was brought down near Campologno. It was manned by a major and a junior officer, born at Genoa, of Austrian parents. The pilot stated that when he was at an altitude of about 3,000 feet he had been surrounded by exploding shells. The major was mortally wounded, and the engine of the machine disabled. The pilot was descending in a *volplane*, trying several times to restart his engine without success, and when about to land he jumped from the machine, which saved his life. The Austrian major's legs were broken and his skull was injured, and he expired when being carried to a farmhouse.

An even poorer result was achieved by the other Austrian squadron from Aisovizza, the attack of which was directed against the bridges over the Tagliamento. While flying over the Isonzo Plain one machine was brought down by the Italian guns. The other machines only succeeded in dropping two bombs near the Delizia Bridge (Tagliamento), without causing damage.

Finally, the Pola squadron, of twelve hydroplanes, directed against the railway bridges along the Mestre-Portogruara line, was prevented from reaching its objectives by the Italian guns, and had to content itself with dropping bombs, which caused no damage, in the marsh district. Some machines which succeeded in reaching the Piave bridge dropped bombs and caused a small amount of damage. One hydroplane was brought down by the Italian fire near Grado.

Thus this raid, which was to have created havoc behind the Italian front and to have terrorised the Italian people, ended in a real defeat for the Austrians, who lost four powerful machines with eight aviators.

It was not until June 11 that the Italians retaliated. At dawn of that day Italian torpedo boats approached a place on the Istrian Peninsula, and after carrying out a reconnaissance bombarded an important point near Parenzo. With this squadron went another of Italian hydroplanes which swept out from Parenzo, and, after repulsing an attack by an enemy squadron, dropped bombs on the military establishments near Trieser, in spite of the lively fire of the Austrian anti-aircraft batteries.

A particularly brilliant instance of the work of the Italian hydroplane service was that which occurred in the Lower Adriatic, April 4. Two Italian seaplanes, having bombed a point on the enemy coast, and having put to flight the men who were guarding it, alighted on the sea and reached the coast. The four officers of the hydroplanes then landed and set fire to a house, which was being used as a signal station, and two huts; they also destroyed a number of telegraph poles. They then blew up a small ammunition depot, ignited several coal-stacks, and destroyed the landing-stage. Finally they returned to their machines and flew back to their base.

Italian Airships

The same day occurred an unusually daring Italian airship raid in the Upper Adriatic. Throughout the work of the Italian dirigibles was noteworthy in that it was carried out in all sorts of weather, and there was usually a tremendous weight of bombs carried on board. On the occasion of the expedition of April 4, an airship dropped half a ton of bombs on the railway station at Nabresina. All the bombs exploded, and the airship returned unharmed, in spite of the lively fire of the enemy's artillery. Despite heavy clouds and stormy weather, another Italian airship (May 1), reached the Lagarina Valley, where it bombarded the railway from Calliano to Trento, and the railway station at Trento. The permanent way and the station were damaged, and fires broke out. Three days later occurred the worst Italian aerial disaster of the year. An Italian airship crossed the Austrian lines at Wippach and dropped some bombs. It then proceeded in a northerly direction across the Idenia Valley towards Laibach and Salloch, in which region it dropped almost half a ton of bombs. On its return flight, however, the Austrian artillery fire cut it off near Dornburg, and the airship, which was simultaneously attacked by aviators, was set on fire, and fell a wreck near Gorizia. The four occupants were burnt to death.

Nothing daunted by this mishap, however, during the night of August 7-8, one of the Italian airships bombarded the railway junction of Opcina (just north of Trieste, on the supply line to the Isonzo), dropping a ton of high explosive. Good

results were observed. In spite of the fire of numerous anti-aircraft batteries and the attack of two hostile seaplanes, the airship returned safely to the Italian lines. Only one more airship raid of any importance occurred during 1916. In spite of adverse weather, during the night of September 27, an Italian airship succeeded in reaching the Carso, dropping bombs on a column of enemy troops and convoy on the road from Comignano to Castagnevizza. Although discovered by the Austrian searchlights, and fired on by the artillery, the airship returned safely.

Angered beyond measure at the continued successes of the Italian aviators, the Austrians took the meanest and most paltry revenge, bombarding open and defenceless Italian cities, and particularly Venice, whenever and wherever an opportunity presented itself.

Austrian Vandal Raids on Venice

As early as February 19, according to the Italian communiqué: "In reply to the numerous, indeed all too frequent violation by the enemy of the right of the civilian population perpetrated with intense persistency ever since the outbreak of the war, yesterday morning a squadron of Caproni aeroplanes carried out an incursion over Laibach. Although subjected during the whole of their flight to the fire of numerous and powerful enemy anti-aircraft batteries, and attacked by literally enormous crowds of aeroplanes, our daring aviators succeeded in reaching and attaining their objective. Between gaps in the dense clouds our aviators were able to drop some grenades and bombs on the town. One of our Caproni machines, attacked and surrounded by six Austrian aeroplanes, was compelled to come to earth on enemy territory, the others returned unharmed to their lines." This reprisal raid was effected on the Italian part after a particularly wanton enemy raid on Venice.

The historic and ancient churches of the town beside the Lagoon were particularly affected by this new form of invasion. In August the Austrian aviators succeeded in partially destroying the historic edifice of Santa Maria Formosa, and in September the famous old pile of the church of San Giovanni and Paola suffered grievously at the same hands; as also did

that of San Pietro di Castello. On the occasion of the first of these Austrian air-raids, the enemy claimed to have dropped bombs on Venice, aiming at the station, factories, and military establishments. But, says the Italian Government, "in point of fact, the military establishments and the railway line only sustained negligible damage, and among that inflicted on property having no military significance the most serious is the damage caused to the church of Santa Maria Formosa, which was completely destroyed."

If further evidence is required to support this Italian statement, it is to be found in a letter written by the Cardinal Gasparri, Papal Secretary of State and an unbiassed war critic, to the Archbishop of Ravenna, expressing the bitter sorrow and profound regret of the Pope at the sufferings and loss of life of the innocent victims as the result of the Austrian air raids. "His Holiness," the letter concluded, "as the vigilant custodian of the supreme interests of religion, history, and art, has not failed solicitously to repeat his paternal insistent injunctions to the Austro-Hungarian Government that the war should be conducted in conformity with recognised principles. With regard to open and undefended cities, and the safeguarding from misadventure of their precious treasure of monuments and churches, his Holiness has expressed the wish that in the Italo-Austrian war the use of aeroplane bombs might be entirely suppressed. If this noble intention has not been achieved, it is not from any want of warm interest on the part of the Common Father of the Faithful, but for reasons which he will explain personally when opportunity offers."

The Caproni Machine in Action

As compared with the futility of these barbarian outrages on the Austrian part, the record of activity of the Italian Caproni bombing squadrons was a splendid one indeed. Apart from devastating raids on Austrian munition works and naval bases miles behind the fighting front, the daring Italian aviators played havoc with the roads, railways, and railway junctions along the enemy lines of communication. Frequently these squadrons operated with as many as thirty machines at one time. This campaign was most active after June 15, when a squadron

of Capronis bombed the railway station of Mattarello (Lagarina Valley) and encampments at the junction of the Nos and Campomulo Valleys (on the Asiago Plateau). No less than thirty-seven Capronis and Farman machines participated the following day in a raid on the Adige Valley. Altogether these machines dropped 160 bombs and 60,000 arrows on enemy encampments north of Asiago, and in Nos Valley. Thirty-four Caproni machines, again, on the 21st, bombarded the Pergine aviation station at the head of the Val Sugana.

One of the most brilliant actions of the aerial war in Italy, and one which caused the Austrians very heavy damage in a strictly military sense, was that carried out on August 1. The Whitehead torpedo and submarine factory, a machine factory, and the Danube shipbuilding yards, which stood in a group some three kilometres west of Fiume, was the objective on this occasion; a most successful expedition.

In spite of the heavy fire of the Austrian anti-aircraft artillery and the attacks of enemy aeroplanes, the Italian airmen succeeded in dropping four tons of bombs, which did much damage to the Whitehead works, and set them on fire.

After a further series of heavy raids in August, the Caproni squadrons concluded a most successful twelve months, with one big effort in September. The August raids were of considerable importance. In bad weather conditions, one squadron bombarded the railway junction of Opcina on August 7. On the 10th, another squadron of eighteen machines, escorted by Nieuport machines, raided the supply stations of Peravacina and Dornberg. More than three tons of high explosives were dropped on the railway station and on the military depots. Then on the 26th a Caproni squadron bombed the railway station of San Christoforo, north of the lake of Caldonazzo (Brenta). On September 14, in unfavourable atmospheric conditions, a squadron of twenty-two Caproni battleplanes, escorted by Nieuport chasers, made a raid on Lloyd's arsenal and the seaplane sheds near Trieste. One hundred and seventy-two bombs, equivalent to five tons of high explosives, were dropped on the railway establishments and the ships in construction.

CHAPTER XV

ODDS AND ENDS OF THE 1916 AIR WAR

The Near-Eastern Campaigns—Aircraft at Salonika—Seaplanes over the Holy Land—Kut and After—Air Work along the Indian Frontier —Russia *in Extremis*.

IMMENSE as was the area covered by the British aircraft in the innumerable little, but highly important, wars waging in the Near East in 1916, the actual geographical distance, because of the immense speed of the aircraft, appears less than in previous campaigns, when only foot troops were employed, and the fastest means of transport was a mule train, or an occasional motor tractor. It is curious to note, too, that the farther east the British armies penetrated, the more valuable became the work of the scouting and bombing machines, and more and more the local battle depended on the success or otherwise of the aerial observers' reports.

If the pilots and observers did not accomplish miracles in these many small wars, the very nature of the work undertaken throughout suggests the impossible and the miraculous. The Balkan campaign was noteworthy for Sub-Lieutenant Louis Noel's daring flight from Salonika, across the mountainous and climatically dangerous countryside of Bulgaria, to Bucharest, a distance of over 350 miles. Along the coast of the Holy Land, despite the desperate climatic and geographical conditions there existing, a British seaplane squadron carried the air war far into the heart of the enemy's country. Aeroplanes played a most romantic part in the unsuccessful attempt to relieve General Townshend's army, besieged by the Turks in Kut-el-Amara; while, some 3,000 miles farther to the east, 6,000 Indian rebels were dispersed in a panic at the first onslaught of a British aeroplane.

Lieutenant Louis Noel's great flight to Bucharest did not take place until after the autumn was well advanced, and after-

wards a similar voyage was carried out by several R.F.C. pilots. Meanwhile, the first event of importance undoubtedly was the German Zeppelin raid on Salonika. On a rough estimate the damage caused by the airship's bombs in this raid amounted to no less a sum than £240,000. However, while it was successful from a military point of view, the enemy had never anticipated the immediate moral effect it would have upon the Allied military command. For some months the British and French troops around the city had appeared to be seized with an unusual inertia. No movement of any importance had occurred since the previous autumn, and dry rot had set in in the ranks. The Zeppelin raid had a similar effect to stirring up a wasps' nest with a stick. The wasps swarmed out in angry fury, and when it is remembered that those same wasps consisted of high-powered aeroplanes of great bombing capacity, the result to the enemy can be well imagined.

On the third day after the Zeppelin visit, French aeroplanes bombed and machine-gunned Monastir. Their bombs struck the "old red barracks" and the new barracks built by the Germano-Bulgars, the artillery camp, the Konak, which was now the headquarters of the Germano-Bulgar staff, the military club, the wireless station, the town hall, which had been fortified by the Bulgarians, and also the fortified heights round Monastir. The number of casualties inflicted was pretty considerable, while the whole duration of the bombardment was less than a quarter of an hour. These wonderful results were achieved with a new type of naval gun carried by the French airmen, the exact calibre of which was kept a secret, but which, it was said, could be fired both obliquely and vertically. Another reprisal raid was carried out two days later, when French aeroplanes shelled and bombed a Bulgarian camp of 600 tents at Pazarli, north of Doiran, and 50 miles from Salonika. The French airmen came low and raked the enemy camp with their machine-guns, setting fire to many of the tents, and were able to take photographs showing columns of smoke rising from the camp. The whole squadron returned to Salonika without loss.

From that date on a pretty extensive series of bombing raids on enemy positions was maintained. Among the positions thus bombarded were Monastir (twice), Prilep, Konali, and Bursul;

the Drama aerodrome, from which the Germano-Bulgar airmen carried out their raids upon Salonika, was visited on no less than three occasions, and Buk bridge was bombed effectively by the pilots of the R.N.A.S.

The naval men took a big part in this intensive bombing campaign. Simsirli bridge was another of their objectives. In the region of the Dardanelles seventy bombs were dropped by naval aircraft on May 22. In the same area occurred a most exciting sea chase, when an aeroplane dropped bombs on a Turkish river craft. Three of the bombs hit the vessel's after-bridge, setting it on fire, so that it was only with difficulty that she was able to get away from the neighbourhood of Kephalos Bay. More machines then pursued a hostile warship and three hostile destroyers which came to the rescue of the river craft, and one hit a destroyer; a splendid period of achievement which the naval aviators celebrated with a night raid on Constantinople.

Squadron-Commander J. Smyth Piggott, Flight-Lieutenant K. Savory, Flight Sub-Lieutenant R. Dickinson, and Flight Sub-Lieutenant I. Barnarto, who were the aviators concerned in the raid, set out on the evening of April 14, on three naval aeroplanes. Though fine weather prevailed at the start, adverse conditions superseded, with wind, rain, and thunderstorms. Nothing daunted, however, the daring raiders completed the flight to Constantinople and back, which was a distance of over 300 miles. Bombs were dropped on the Zoitunlik powder factory and the aerodrome hangars. One machine detached itself from the main expedition and visited Adrianople, dropping bombs on the railway station.

Carrying a message from General Sarrail to the French Minister at Bucharest, Sub-Lieutenant Noel, accompanied by three other French pilots, on September 14 set out from Salonika to fly to Bucharest, the capital of Roumania. They accomplished this flight of over 350 miles, after dropping several bombs and a parcel of proclamations on Sofia, the capital of Bulgaria; the successful result of their daring flight being followed by 124 similar flights by French machines to Roumania, which country was hard pressed at that time. Four British machines, each with two pilots, on October 27, set out from

Imbros, and flying over 312 miles, reached the Roumanian capital in five hours. One of these British aviators, Lieutenant Harvey, travelled by way of Thrace and the Bulgarian town of Adrianople. *En route*, while flying very low, he was attacked by Bulgarian artillery, but escaped injury. His unexpected appearance over Bucharest caused a panic.

The Noel flight, more spectacular in its nature, was noteworthy by reason of the hundreds of proclamations dropped by the French pilots when over Bucharest. These proclamations read as follows:

"People of Sofia! The soldiers of the Entente do not fight against the civil population. Our airmen bomb only military establishments. Zeppelins and German aeroplanes throw bombs on Salonika and Bucharest, assassinating old men, women, and children. The Germans alone are capable of such deeds. Such crimes call for vengeance. People of Sofia! Your town to-day expiates the crimes of your allies. If such crimes are again committed, they will be followed by the same punishment."

According to a French pilot, who participated in the raid, the four machines left Salonika at twenty minutes past six in the morning on a military mission, and with orders to drop bombs on Sofia as a reprisal for the recent bombing of Bucharest. They arrived over Sofia at twenty minutes to ten without having met any adventure on the way. As the gilded dome of the Royal Palace first came into sight, glittering in the brilliant sunshine, Bulgarian batteries opened fire on the French machines from all sides, but fortunately without success. An attack by a German aeroplane proved equally unsuccessful. And at twenty minutes past eleven the first aeroplane arrived at the Bucharest aerodrome. The second reached the same place at 3 o'clock, while the two others landed in Roumanian territory.

Seaplanes over the Holy Land

Between August 25 and 29, 1916, a series of attacks and reconnaissances upon the enemy railway communications in Palestine was carried out by a British seaplane squadron. These flights were made under somewhat hazardous conditions, due to the fact that the railway runs, for the most part, behind a range of mountains difficult for seaplanes to surmount. Bombs were

dropped on Afuleh junction, where considerable damage was done to the rolling-stock, permanent way, and to the stores in the vicinity. A railway engine and fourteen carriages were also set on fire and destroyed. The railway stations at Tulkeram and Ardana, and an enemy camp four miles north-west of Remleh, were successfully bombarded and severely damaged. On August 26 another British seaplane bombarded the railway station at Homs. This flight, carried out at a distance of 45 miles inland under extremely adverse conditions, and through clouds low down on the mountains, was a singularly fine performance for a seaplane.

Kut and After

"The eye in the air is nowhere so essential as in the desert, where all objects conspire in illusion." The words are those of Mr. Edmund Candler, official press correspondent with the British armies in the East; written from Aral village, Mesopotamia, on October 28, 1916. In one phrase the writer conjures up the picture, which, in a few well chosen words, he supplies the most realistic details.

"Up in the air," he continues, "one loses the mirage. Immediately you leave the ground things cease to be blurred. The dancing images and amorphous shapes of a level horizon become infantry, or sheep, or camels. . . . I heard a subaltern observer describing an action early in the campaign when he was in the only machine available at that particular time and place, and he had no wireless. The whole thing seemed so simple and easy from his perch in the air. He could see our own cavalry and the enemy's approaching each other in the haze, neither having any idea of the other's existence. He felt that he could turn the tide of battle, or rather turn an inconclusive engagement into a big *coup*, if only he could make himself heard. But down below everything was obscured in mirage, and so we may have missed a chance.

"But that was in an early phase of the show. We have had time to make good in the air since then in man-power, machine-power, staff, and material.

"Our ascendancy in the air is as complete here as in France. The closest touch has been established between artillery com-

manders, and pilots, and observers, with damaging effect to the enemy's guns. Air photography, as a means of charting a hostile and unsurveyed country, has been brought to a scientific finish. Hangars have reduced the wastage of our machines, which in the earlier days warped and shrank in the alternate rain and sun. By constant bombing raids, especially at night, we have established an aggressive offensive. The result of fights in the air has been that a week often passes without a sight of a hostile plane.

"Low flying, no easy thing in the dark, has become the rule of late. In a raid at Shumran the other night one of our machines was hit by splinters from its own bomb. The effective machine-gun fire near the ground, in co-operation with our cavalry, has been the most remarkable development in the air. Our aeroplanes have become the terror of thieves, raiders, and irregular horse. It is impossible for them to get off with their loot in the morning. No nullahs are deep enough to hide them. Our machines, flying a few feet above ground, scour the whole desert, rake their hiding-places with machine-gun fire, scatter and pursue their cavalry, spreading panic among their horses, and round up the retiring convoys, while our cavalry follow up and bring back the spoil. Such was the result of an attempt to raid our camel transport at Sheikh Saad. Of course, an action of the kind would be impossible over the enemy's position, but on the line of communications it is most effective. Our flying men have discovered a short way with raiders."

Previous to this date, during the operations in Mesopotamia from October to December, 1915, and during General Townshend's concentration at Aziziyeh, accurate information was obtained by aerial observation regarding the position of the Turkish defences. Unfortunately, during the actual period of the battle at Ctesiphon, a series of accidents deprived the Royal Flying Corps of several officers and machines. Among those forced to descend within the enemy's lines was Major H. L. Reilly, a flight-commander of exceptional ability, who had much distinguished service to his credit. In November the aircraft rendered yeoman service by constantly reporting the movements of the opposing divisions of enemy troops. At one time it appeared as if the Turk would retire from his remaining

positions. Then, apparently, he received fresh reinforcements on the 25th of the month, and that afternoon, suddenly, large columns of troops were seen by the aerial observers to be marching down the left bank of the river. Only in the nick of time, and due to this fortunate warning, was the enemy prevented from outflanking the British infantry, while hostile cavalry threatened our rear.

According to the Turkish officials, General Townshend, immediately before the surrender of Kut, ordered certain war stores, including three aeroplanes, to be thrown into the River Tigris, and these machines were afterwards salved and flown by enemy pilots. This statement is incorrect. There were no British aeroplanes in Kut-el-Amara at the time of the surrender. In fact, the only method by which our commanders outside the city could communicate with the besieged garrison was by means of aeroplanes flying over the city, and dropping the necessary communications between Generals Lake and Townshend, and, conversely, picking up flash-lamp signals from within the city walls.

In the hope of prolonging the resistance of Kut for even a day or two, the Royal Flying Corps and Royal Naval Air Service dropped into the city, between April 16 and April 29, approximately eight tons of supplies, besides fishing-nets, medicine, and specie. Although these supplies could not materially alter the course of the siege, it was a performance which was deserving of high praise, for it involved a great strain on the pilots, and the journeys were subject to attacks by enemy aircraft of superior speed and fighting capacity. One of the British machines was shot down while engaged on this supply service, another was damaged, but brought home safely with great skill.

The Air Service, which included both the Royal Naval Air Service and the Royal Flying Corps, distinguished itself throughout by hard work and devotion to duty, and the assistance which it afforded to other arms was invaluable. Never fully manned, it found itself, towards the end of the last advance, very short-handed and faced by one or more enemy machines of considerably greater speed and fighting capacity, but its efficient work was nevertheless maintained.

Odds and Ends of 1916

Up to August, when Sir Percy Lake relinquished the command to General Maude, the superiority of certain of the hostile aircraft over any of the British machines in the matter of speed, combined with a large reduction in the number of British pilots (due to sickness partly attributable to overwork), enabled the enemy in May and June to establish what was very nearly a mastery of the air.

With the arrival of more pilots from home matters improved, until in August three of our machines, working together, forced the best enemy machine, a Fokker, to descend, seriously damaged, in its own lines. And in December, during the night of the 14th-15th our aeroplanes, flying by moonlight, successfully attacked the pontoon bridges on the Tigris, which the enemy had removed from their sites and was towing upstream. The material was broken up and scattered.

Air Work on the Indian Frontiers

On November 14, 1916, the Government of India reported that large Mohmand forces, estimated at 6,000, were collecting on the border opposite Shubkadr. Our troops engaged them on the 16th. The enemy were too scattered to offer a good target for guns. For the first time in Indian warfare aeroplanes were used, and afforded great assistance. The enemy losses were one man killed and ten wounded. The Mohmand forces immediately withdrew, for a reconnaissance flight of the following day only located a very small party.

Russia *in Extremis*

Up beyond the Hindu Kush, that grey, mountainous, natural frontier of all the Indies, while this insignificant and unsuccessful rebellion was fomenting; beyond the further range of the Ural Mountains, the seed of revolt was daily, almost hourly, ripening into the most momentous upheaval of our times, which was to upset the balance of the whole world, and for one trying hour to jeopardise the safety of allied democracy, if not of civilisation itself. Aircraft which, far south in India made history in one short hour of routine patrol, lent only glory to the closing stages of the greatest tragedy of the war.

Like some maddened giant rushing blindly on to his doom, the Russian traitors, bartering away the glorious lives by thousands of their huge unwieldy military machine, daily were driving them forward to certain death. But such is the queer paradox of human nature; while Russian treachery was daily growing more apparent and more repugnant to the whole world, the daring of her fighting forces soared to the extreme heights of sacrifice and gallantry. And bravest and most gallant of all services was that of the Russian airmen. Just one such instance was that story of the undying heroism of Volunteer Airman Puchkel, of Tisvenko, "The Great," of Staff-Captain Beridge, and of a hundred others.

Meanwhile, events in Russia were taking place with deadly rapidity. With the sudden change from the intense cold to the soft, gentle heat of the spring and of the early summer came the beginning of the end. Both Ally and enemy resumed the temporarily abandoned war in the air with desperate ferocity. Brain, organisation, and equipment were the main commitments of this last desperate reorganisation of the Russian air services. During the renewed fighting in Galicia their aviators met with almost unbelievable success, not only widening the sphere of their activity, but even changing its character as a military instrument. As on the Western Front, so here the aeroplane had ceased to be merely a means of scouting, and was becoming more and more a fighting weapon for use in the very thickest of the fray. All the more welcome was this reformation, because, save at the war's beginning, the air service had been one of the weak spots in Russia's military equipment.

Russian seaplanes in February dropped bombs at Zunguldak upon the most important Turkish land establishments and constructions for hauling and loading coal, as well as upon a large steamer lying near the jetty. The bombardment by the Russian aircraft caused considerable damage, fires breaking out on shore and on numerous small wooden ships lying behind the quay. The giant Russian aeroplanes, the Ilya Mouromets, were everywhere in evidence, and one particularly distinguished itself at Dowdzevas (on the Mitau-Kreuzburg Railway) south-east of Friedrichstadt. Thirteen bombs, each weighing 40 lb., were dropped, besides seven others with

splinters. But great as was the Russian daring, greater still was German cunning.

In January, German balloons commenced to bestrew the Russian lines with lying propaganda, dropped from balloons. Propaganda-dropping was one of the main features of the German campaign, while, at the same time, it was accompanied by the most intensive series of bombing raids on the helpless Russian women and children. At last in one certain week in August the enemy commenced a campaign which can only be characterised as pure murder. Every day there were bomb raids. The German machines flew as low as possible, pouring machine-gun fire into the panic-stricken population, which bore the brunt of all these attacks. One day's toll, after such a raid, was eleven killed and forty wounded. The latest form of German bomb employed was one filled with fragments, while the hospitals were also being bombed daily, the English hospital having suffered already twice from this atrocious practice. The enemy airmen also swooped down and dropped bombs on the high roads behind the lines. Between Stokhod and Lutsk, which is open country, discovering an unprotected column of ambulances plodding through the dust, an enemy aviator planed down just above it and opened fire with a machine-gun, killing twenty wounded men within. If any added incentive was necessary to persuade the Russian peasant to have done with the terrible war, it was supplied by this unwarranted massacre from the air. While derision fails one before so inhuman an attitude, only praise can be found for the heroism of the Russian aviators at the same time.

Hero of a hundred fights, Ensign Tisvenko willingly sacrificed his life in a blazing aeroplane in order that his commander should receive some highly necessary reconnaissance reports. Hit by an enemy shell when over his lines, his machine burst into flames. But Tisvenko persisted; despite the roaring flames, he collected the necessary information. Flying back hurriedly to the Russian lines, this gallant young man dropped his report in a sealed packet, and when eventually his machine came down to earth, charred and burnt beyond all recognition, the spectators found only a blackened corpse in the pilot's cock-pit. Staff Captain Beridze deliberately rammed a German

machine in mid-air, and both he and the enemy perished in the attempt. While the story of Puchkel is best told in the words of the Russian official report, which describes a fight in the air which took place over the enemy's encampments west of the Dvinsk positions, and which was remarkable for the coolness and courage displayed by the Russian airmen. "The volunteer airman, Puchkel, and the observer, Second Lieutenant Kovenko, set out on an air reconnaissance. Beyond Aheli railway station our machine was suddenly attacked from the rear by a Fokker. The first shots wounded Lieutenant Kovenko in the hand, but this did not prevent our machine from wheeling round, and in its turn attacking the enemy, who was put to flight. After that our machine continued its reconnaissance, which it carried to a successful conclusion. Beyond Rakishki railway station the Fokker again attacked our machine, damaging it in several places by well-aimed fire. Nevertheless, under our machine-gun fire the Fokker rapidly flew off out of sight, but it soon returned and attacked our machine for the third time, just when Lieutenant Kovenko, in spite of his wound, was stopping up a hole which a bullet had bored in the radiator to prevent leakage of water, which would have forced our machine to have landed all too soon. Lieutenant Kovenko received a second wound, this time an explosive bullet in the stomach, but in spite of the gravity of the wound he completed his task and sat down again at the machine, opening fire. The Fokker was soon brought down. Puchkel, in spite of the serious damage to his machine, which was gradually coming down, and of the fire of the enemy batteries below, continued his flight, and with amazing courage and presence of mind brought the machine back to the aerodrome, with Lieutenant Kovenko gravely wounded and unconscious."

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